

History and belief coalitions in conservation conflict

A case study of conservation and management of wolves and wild boar in the Western Carpathians



Student: Brian Reilly B.Sc. 6996302
b.a.reilly@students.uu.nl

Submission: 25.7.22

Word count: 25,674

Supervisors: Prof. Hens Runhaar
Dr. Ine Dorresteyn

Second reader: Dr. Marjanneke Vijge

Summary

Human-wildlife conflict (HWC) is a key issue facing wildlife conservation. The Western Carpathians are the site of increasing human-wildlife conflicts as the human population grows, more land is developed, and wolves make a comeback in Europe. The negative interactions of HWC result in costs for humans, their resources, wildlife, and habitats. Research indicates HWC is often driven by underlying human-human conflicts, known as conservation conflicts. In the Western Carpathians, groups of stakeholders clash over the level of protection of the wolf, and the appropriate management of the wild boar population. Conservation research however pays little attention to social factors driving conservation conflict, or factors that promote cooperation in conservation. This research begins to fill this gap by exploring how local historical developments in the Western Carpathians influence stakeholder cooperation in the conservation and management of wolves and wild boar. The research tests the hypothesis that historical developments inform the development of individual's beliefs which in turn form the glue that binds together coalitions of cooperating stakeholders in wildlife conservation and management. To test this, data on stakeholder cooperation, beliefs, and narratives regarding historical developments were collected through in-person interviews with 21 conservation and management stakeholders. Network analysis was applied to the cooperation data, and qualitative content analysis was applied to beliefs and narratives. As predicted by the advocacy coalition framework (ACF), policy core beliefs regarding problem framings and preferred solutions to HWC were the glue that held coalitions together. Stakeholders' historical narratives were more frequently shared between coalitions than within them, that is, they bridged separate coalitions. No evidence of a causative relationship between narratives and beliefs was found. The research demonstrates the relevance of investigating the social factors underlying conservation conflicts and HWC. The advocacy coalition framework is particularly applicable to the context of conservation conflicts by highlighting commonalities in coalitions' understandings of problems and solutions. With the addition of network analysis, this multi-disciplinary approach was particularly suitable for 1) relating individual level perspectives to group-level dynamics; and 2) identifying bridging stakeholders, beliefs, and narratives, which can be utilised by stakeholders or future research to initiate discussion, trust, and new cooperation and promote coexistence with wolves and boar.

Key concepts:

conservation conflict; historical context; beliefs; coalitions; cooperation network

Acknowledgements

I would like to express my deepest gratitude to Prof. Hens Runhaar for his invaluable guidance and feedback, and to Dr. Ine Dorresteyn for same and for giving me the opportunity to participate in this project. This would not have not have been possible without funding from the NWO for the translators and transport costs. I am deeply indebted to Adéla Pohořelá, Marek Bock, and Bohuslav Kuřík Ph.D. for their invaluable help during the fieldwork, and for truly making it a special (and enjoyable) experience. I am also thankful to Dr. Marjanneke Vijge for her feedback and to Prof. Julia Leventon for her ideas for the research proposal. None of this would have fallen into place if not for a conversation with Dr. Frank van Laerhoven in September 2021. Special thanks must go to my classmates who have been an immense source of support, wisdom, and balance these last few months. I'd like to mention Clara, my family, and my friends, who filled these last two years with meaning for me. Lastly, I am greatly thankful to all of the participants and contacts I met during the fieldwork, who brought the research so vividly to life.

Table of Contents

1	INTRODUCTION.....	6
1.1	RESEARCH AIM	7
2	THEORETICAL FRAMEWORK	8
2.1	NETWORKS AND COOPERATION	8
2.2	COALITIONS AND BELIEFS	9
2.3	HISTORICAL CONTEXT AND NARRATIVES	10
3	METHODS	12
3.1	OPERATIONALISATION.....	12
3.1.1	<i>Stakeholders, cooperation, and coalitions</i>	<i>12</i>
3.1.2	<i>Beliefs.....</i>	<i>13</i>
3.1.3	<i>Historical developments and narratives of change.....</i>	<i>14</i>
3.2	RESEARCH STRATEGY	14
3.2.1	<i>Case study selection</i>	<i>15</i>
3.2.2	<i>Generalisability</i>	<i>18</i>
3.3	DATA COLLECTION.....	19
3.3.1	<i>Sampling</i>	<i>19</i>
3.3.2	<i>Interviews.....</i>	<i>21</i>
3.3.3	<i>Informed consent</i>	<i>22</i>
3.4	DATA ANALYSIS	22
3.4.1	<i>Cooperation.....</i>	<i>23</i>
3.4.2	<i>Qualitative content analysis.....</i>	<i>24</i>
3.4.3	<i>Belief-coalitions and narrative coalitions.....</i>	<i>25</i>
3.4.4	<i>Establishing relationships between the variables</i>	<i>26</i>
4	RESULTS	28
4.1	STAKEHOLDER COOPERATION IN WOLF CONSERVATION AND BOAR MANAGEMENT.....	28
4.1.1	<i>Cooperation network</i>	<i>28</i>
4.1.2	<i>Coalitions.....</i>	<i>33</i>
4.2	THE INFLUENCE OF STAKEHOLDERS' BELIEFS IN COOPERATION	35
4.2.1	<i>Secondary aspects.....</i>	<i>36</i>
4.2.2	<i>Policy core beliefs.....</i>	<i>36</i>
4.2.3	<i>Deep core beliefs.....</i>	<i>39</i>
4.3	THE INFLUENCE OF STAKEHOLDERS' HISTORICAL NARRATIVES IN COOPERATION	41
4.3.1	<i>Narratives and coalitions</i>	<i>42</i>
4.3.2	<i>Relating beliefs and narratives.....</i>	<i>43</i>
4.4	SUMMARY OF THE RESULTS	46
5	DISCUSSION	47
5.1	THEORETICAL IMPLICATIONS.....	47
5.2	IMPLICATIONS FOR THE CASE STUDY	49
5.2.1	<i>Improve the compensation and subsidy system.....</i>	<i>50</i>
5.2.2	<i>Protect the cultural landscape</i>	<i>51</i>
5.2.3	<i>Bridging stakeholders.....</i>	<i>52</i>
5.3	LIMITATIONS.....	52
5.3.1	<i>Reliability.....</i>	<i>53</i>
5.3.2	<i>Validity</i>	<i>53</i>
6	CONCLUSIONS.....	56
7	REFERENCES.....	58
8	APPENDIX	64

List of Figures

Figure 1 Conceptual framework.	9
Figure 2 Research flow.	12
Figure 3 The case study site.	16
Figure 4 Cooperation network.	28
Figure 5 Coalitions and beliefs regarding the nature of the problem.	37
Figure 6 Coalitions and beliefs regarding problems and solutions.	39
Figure 7 Coalitions and deep core beliefs.	40
Figure 8 Coalitions and narratives.	43
Figure 9 Coalitions, narratives, and secondary aspects.	44
Figure 10 Coalitions, narratives, and the nature of the problem.	44
Figure 11 Coalitions, narratives, and the ideal solutions.	45
Figure 12 Coalitions, narratives, and deep core beliefs.	45

List of Tables

Table 1 Breakdown of the 21 participating stakeholders' attributes.	21
Table 2 Stakeholders.	29
Table 3 Coalitions.	33
Table 4 Bridging stakeholders.	34
Table 5 Stakeholders' beliefs.	35
Table 6 Stakeholders' historical narratives.	41

Abbreviations

HWC	-	Human-wildlife conflict
ACF	-	Advocacy coalition framework
SNA	-	Social network analysis
QCA	-	Qualitative content analysis
CZ	-	Czechia
SK	-	Slovakia
NGO	-	Non-governmental organisation
PLA	-	Protected landscape area
ASZ	-	Association of Private Farmers of Czechia
SCHOK	-	Union of Sheep and Goat Breeders of Czechia
OMS	-	District hunting association
LCR	-	National Forestry Organisation of Czechia
LSR	-	National Forestry Organisation of Slovakia
NPF	-	Narrative policy framework

1 Introduction

Conflicts between humans and wildlife lead to the pain and suffering of humans and animals alike, the loss of species and biodiversity, and economic losses (Nyhus, 2016). Human-wildlife conflicts (HWCs) are driven by underlying human-human conflicts (Dickman, 2010; Redpath et al., 2013). These ‘conservation conflicts’ (Redpath et al., 2013, p. 100) occur between people or groups with conflicting interests, beliefs, or goals regarding wildlife management and conservation, such as locals and authorities, or people from different cultural backgrounds (Dickman, 2010). Globally, human-wildlife conflicts and conservation conflicts are becoming more frequent (Redpath et al., 2013; Young et al., 2007). The surprising comeback of large European carnivores such as wolves in the Western Carpathians has come into conflict with rural communities (Chapron et al., 2014). This has led in some areas to losses in livestock (Kovářik et al., 2014); poaching curbing the expansion of the wolves’ range (Kutal et al., 2016); and conflicts between stakeholders in wildlife management and conservation (Young et al., 2007).

The HWC literature has been growing in parallel with the uptick in HWC: with 2,101 peer-reviewed articles containing the key phrase “human-wildlife conflict” published since 1991, and 300 of those published in 2021¹. However, the HWC literature is dominated by ecological studies and lacks social scientific and multidisciplinary research attempting to explain the social drivers of conservation conflicts (Nyhus, 2016; Lozano et al., 2019). A Scopus citation analysis showed that of 2,101 articles, less than 8% were social science-based, and less than 3% were multidisciplinary. It is imperative to conservation outcomes for communities and wildlife that we improve our understanding of the factors influencing stakeholders’ interactions in conservation conflicts (Gutiérrez et al., 2016).

The literature examining the social factors underlying conservation conflicts has so far investigated the influence of stakeholders’ perceptions of risk (Dickman, 2010), institutional change and accession to the EU (Young et al., 2007), financial instruments for encouraging coexistence (Dickman et al., 2011), and values at the individual level (Horcea-Milcu et al., 2018). A series of studies have also examined the influence of shifts in the wider socio-cultural context on conservation-related values (Bruskotter et al., 2017; Dietsch et al., 2016; Manfredo et al., 2016; Manfredo, Teel, Carlos, et al., 2020). In particular, this body of research deals with the effects of modernisation on societal values orientations regarding humans’ relationship to nature, defined as either domination and mutualism (Dietsch et al., 2016). It was found that modernisation has driven a shift in value orientations from domination towards mutualism in the USA, although similar results have been found in a global study by Bruskotter et al. (2017). The authors of this latter study found that, contrary to expectations, modernisation may be contributing to improved conservation outcomes for large carnivores via changes to perceived risks and value orientations. Horcea-Milcu et al. (2018) meanwhile describe traditional value orientations in a Romanian cultural landscape being eroded or crowded out by the external pressures of modernisation and the growth of the global market economy.

These studies suggest that there is an underlying influence of the local historical context on stakeholders’ internalised systems (values, beliefs, and attitudes) and consequently on their behaviours in conservation conflicts (Kaiser et al., 2005). It is logical that the historical context of any complex social system is important in determining the system’s current state (e.g. Horcea-Milcu et al., 2018). The past and historical developments provide the context for all future developments, and through learning and socialisation, contributes in large part to the

¹ Scopus query TITLE-ABS-KEY("human wildlife conflict") returned 2101 articles.

formation of individuals' attitudes, beliefs, or interests (Kaiser et al., 2005; Lynne et al., 1988; McAfee et al., 2020). Local historical context is therefore a social factor likely to be influencing conservation conflicts, when the latter understood as social systems consisting of the aggregated behaviours and choices of individuals (Bodin et al., 2020). Historical developments, such as changes to prevailing socio-economic conditions, may have a detectable influence in contemporary stakeholder interactions (Jenkins-Smith et al., 2018). Thus far however the literature has not given attention to the influence of historical context in conservation conflicts.

I addressed this gap in the literature with a social-scientific case study of the influence of local historical context on a conservation conflict in the Western Carpathians. Conservation conflicts represent cooperation dilemmas for the stakeholders involved (König et al., 2021). The cooperation of diverse stakeholders is commonly cited as an essential for overcoming cooperation dilemmas and successfully managing HWC (Bodin, 2017; Ostrom and Cox, 2010). Social network theory explains Group-level cooperation as the aggregate of individuals' behaviours (Bodin et al., 2020). These behaviours are understood by the advocacy coalition framework (ACF; Sabatier, 1988; Sabatier and Jenkins-Smith, 1993) to be motivated by individuals' internalised systems of beliefs (Jenkins-Smith et al., 2018). This research makes a novel contribution to the field by mobilising the ACF and social networks as the conceptual basis to link historical context to conservation conflict. The ACF is often combined with social network analysis (SNA) to identify stakeholders and their cooperative interactions (e.g., Satoh et al., 2021). Cooperation networks can then be investigated to assess whether stakeholders' beliefs drive cooperation through the formation of advocacy coalitions (Sabatier and Weible, 2007; Wagner and Ylä-Anttila, 2018).

1.1 Research aim

The research aimed to contribute to a better understanding of the influence of historical context in shaping conservation conflict, by empirically investigating the impact of local historical developments on stakeholders' cooperation networks and beliefs in relation to wolves (*Canis lupus*) and wild boar (*Sus scrofa*) in the Northern Czech-Slovak border region of the Western Carpathians. The case study site is characterised as a cultural landscape where traditional pastoral agriculture has evolved alongside an associated ecosystem. This unique landscape is threatened by increasing development, while traditional livelihoods are under pressure from multiple directions, including the return of the wolf to Czechia after an absence of more than a century (Kutal et al., 2018). Both wolves and wild boar come into conflict with human activities, and there is ongoing social conflict regarding their conservation and/or management.

The research set out to answer the following main question: *How does local history influence stakeholder cooperation in the conservation and management of wolves and wild boar in the Western Carpathians?* To aid in answering this question, the following sub-questions guided the research:

- SQ1. Who are the stakeholders in conservation and management and what cooperation networks and coalitions can be identified?
- SQ2. How do beliefs influence coalition-formation and cooperation networks?
- SQ3. How do stakeholders' historical narratives relate to beliefs and coalitions?

2 Theoretical framework

To answer the research questions, I drew on key concepts from social network theory, the advocacy coalition framework, and the concept of historical narratives. I used a network theory perspective to characterise conservation cooperation at the case study site and mobilised the ACF to link cooperation to stakeholders' beliefs. This section is structured in line with the research questions to outline and justify the theoretical choices made for the research.

2.1 Networks and cooperation

To answer SQ1, I needed to understand cooperation in wildlife conservation and management as the dependent variable. Cooperation is a form of purposive social interaction between two or more actors. Network theory, a branch of systems thinking, is a popular means of understanding and analysing complex social interactions. Social networks consist of nodes representing actors and ties representing a social interaction, such as cooperation, friendship, or teaching. These ties can have variable weights or 'strengths', providing a useful comparison for different stakeholder relationships. A cooperation network therefore consists of multiple individuals' decisions regarding who to cooperate with, which aggregate to form a web of nodes connected by cooperative relationships (Bodin et al., 2020). In social networks, nodes are often differentiated based on attributes or characteristics, such as the type of stakeholder organisation. Cooperation networks containing stakeholders, ties, and attributes provide a useful means of representing the stakeholder landscape and can also be analysed using statistical methods. These methods may provide network-level measures of cooperation, or a comparison of nodes within the network, and can identify topological characteristics that would otherwise be undetectable such as coalitions (Borgatti et al., 2018, p. 21). The natural resource management literature for instance often employs network analysis to understand network-level cooperation as a dependent variable (e.g., Bodin and Crona, 2009; Prell et al., 2009). Network measures relevant to identifying and explaining cooperation include tie density, cohesion, and centrality.

Tie density is a simple measure of the connectivity of a network, by counting the number of ties as a portion of all possible ties (Bodin and Crona, 2009). The higher the density, the greater the number of stakeholder interactions, and the greater the potential for communication, cooperation, and collective action. A higher number of ties provide more opportunities for communication, which may lead to increased reciprocity and trust, as well as increased exposure to new ideas throughout the network (Ostrom and Cox, 2010). Tie density however does not reflect whether there is an uneven distribution of ties across the network. In a network of stakeholders experiencing a conflict there may be one or more sub-groups or clusters defined by a high tie density within the cluster, but with relatively few ties travelling out of the cluster to other parts of the network. Network cohesion measures 'togetherness', or the degree to which a network is divided into clusters. A less cohesive network implies the presence of clusters with few ties between groups, which reduces the capacity for cooperation between clusters and therefore the overall cooperative capacity of the network (Bodin and Crona, 2009). Clusters tend to connect actors that share some unifying characteristic, such as a shared history, industry, or belief system (Borgatti et al., 2018). Functional clusters can be useful in generating specialised knowledge, but these can be of little use in complex systems such as wildlife management if they remain unconnected (Bodin and Crona, 2009). Therefore, stakeholders that bridge different clusters can greatly increase the cooperative capacity of the network. These bridging actors are said to have a high betweenness centrality, that is, they frequently form part of the shortest route between any other two members of network (Bodin and Crona, 2009). Such actors are needed to initiate or support network-level cooperation, and can provide

opportunities to promote cooperation between clusters involved in conflicts (Borgatti et al., 2018).

Conceptual framework

These network concepts allowed me to characterise cooperation at the case site in terms of cooperation networks and coalitions (SQ1). Since cooperation networks are the aggregated expression of individuals' behaviours and decisions, I looked to stakeholders' motivating normative precepts as the means by which the historical context may influence cooperation. Historical developments and trends filter down into individuals' normative precepts through their lived experiences and cultural learning processes, shaping the internalised systems of beliefs, values, and attitudes (Kaiser et al., 2005; Lynne et al., 1988). These systems then shape and largely determine behaviours and decisions (Kaiser et al., 2005). Beliefs are understood to influence cooperation behaviour by the ACF (e.g., Weible, 2007). Narratives meanwhile are understandings of causality that are formed by stakeholders' lived experiences (Dahlstrom, 2010). I therefore made the assumption that narratives about historical developments would provide a window into the process of the historical context filtering-down into stakeholders' internalised systems of beliefs (Manfredo, Teel, Don Carlos, et al., 2020). I developed hypotheses to relate these concepts to each other, and created a conceptual framework (Figure 1). In the following sections I elaborate on the deployment of the ACF (2.2; SQ2) and historical narratives (2.3; SQ3) to explain cooperation.

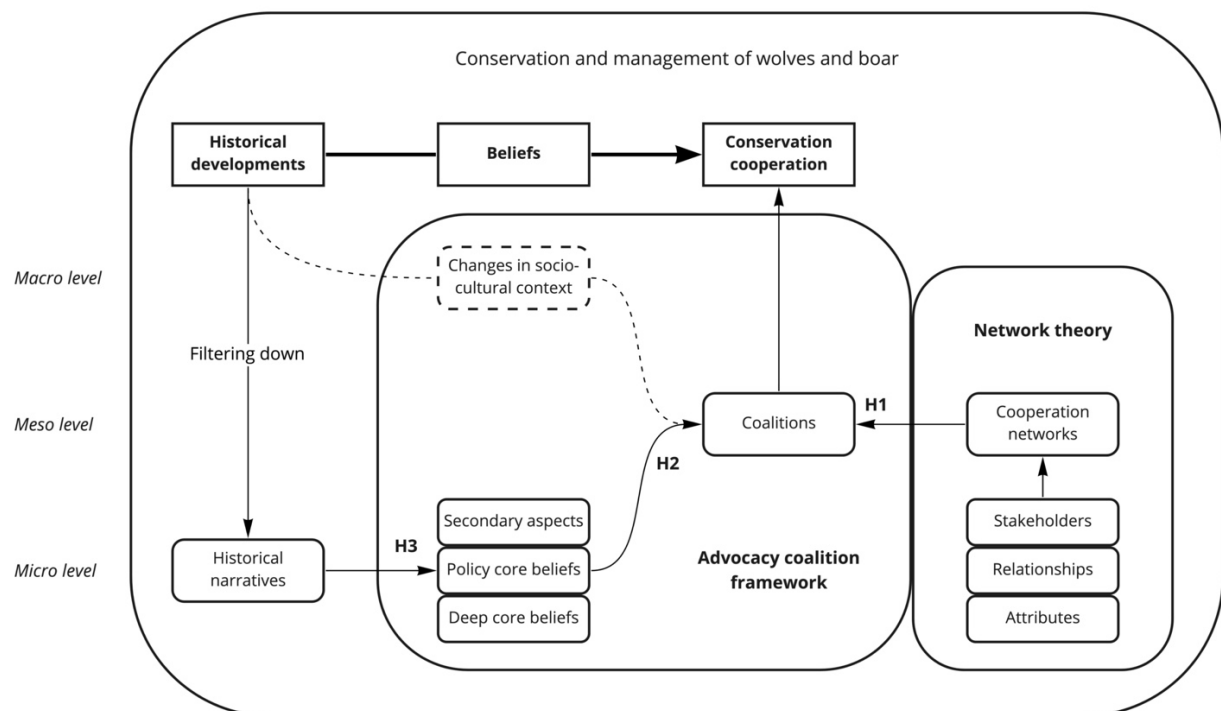


Figure 1 Conceptual framework.

The multi-level framework incorporates elements from network theory, the advocacy coalition framework, and historical developments to explain cooperation in the conservation and management of wolves and boar. Hypotheses one to three are indicated (H1, H2, and H3).

2.2 Coalitions and beliefs

SQ2 seeks to relate beliefs to the cooperation network and coalitions. Stakeholders' beliefs are important in dictating conservation outcomes, insofar as conservation is often dependent on

the cooperation and coordination of stakeholders, whose individual behaviours are motivated in part by beliefs (Dietsch et al., 2016; Ihemezie et al., 2021; Ives and Kendal, 2014; Manfredo et al., 2021). To answer SQ2 I mobilised the ACF. The ACF is an influential policy theory devised to explain long-term policy change, using a three-level perspective:

1. A macro-level where decision-making occurs in a thematic system (e.g., wildlife management) and is influenced by the wider socio-cultural context.
2. A meso-level where actors aggregate into advocacy coalitions.
3. The micro level of individual psychology, and particularly actors' beliefs and preferences (Jenkins-Smith et al., 2018).

The ACF is relevant for this research because it provides mechanisms to explain how the historical context (macro) and stakeholders' beliefs (micro) influence the conservation cooperation network (meso). The ACF assumes the thematic system to be the most useful analytical unit for policy change and understands it as a system of coalitions distinguishable based on beliefs and functions (Sabatier, 1998). Coalitions consist of actors that cooperate towards a specific goal for the system based on having shared beliefs, often relating to perceived problems and solutions (Jenkins-Smith et al., 2018; Sabatier, 1998). Coalition-formation can therefore be understood as an expression of stakeholder cooperation based on shared beliefs concerning wolf and wild boar conservation and management practices.

The ACF assumes that actors are boundedly rational and are motivated by their beliefs to form cooperating coalitions (Jenkins-Smith et al., 2018). Beliefs are divided into three levels: deep core beliefs, policy core beliefs, and secondary aspects. Deep core beliefs are fundamental normative assertions as a result of socialisation from birth and are very resistant to change (Jenkins-Smith et al., 2018), such as beliefs regarding man's place in nature (Manfredo et al., 2021). Policy core beliefs are fundamental beliefs in relation to the thematic system, such as whether it is right to use lethal control in wildlife management. Secondary aspects are narrower in scope and the most likely to change of the three, and may include perceptions about the performance of specific programs and institution such as HWC-compensation schemes (Jenkins-Smith et al., 2018).

The ACF suggests that coalitions form around shared core beliefs, often despite conflicting preferences (secondary beliefs) (Lipsky and Ryan, 2011). It further hypothesises that policy core beliefs "might be the stickiest glue that binds coalitions together" (Jenkins-Smith et al., 2018; p. 195), or in other words, that actors' choices to join or shun coalitions are based on shared policy core beliefs about the nature of the problem at hand and possible solutions. This is not the case for secondary aspects or deep core beliefs, which can vary within coalitions. Differing deep core beliefs do not preclude the possibility of finding shared problem understandings and preferred solutions (Sabatier, 1998). This provides the research with an explanatory relationship between conservation cooperation and stakeholders' beliefs as regards to wolf and wild boar conservation.

2.3 Historical context and narratives

The historical context is one of many social factors that are likely to underly conservation conflicts but have remained unexplored in the literature (Dickman, 2010; Redpath et al., 2013). The ACF suggests a means for historical developments to influence cooperation: a key factor driving change in the thematic system of the ACF is change at the macro level, which includes developments in the wider socio-cultural or political context (Sabatier, 1998). Developments including changes in government, transitions in economic policy, or shifts in collective values can drive changes in the structure and distribution of coalitions and the cooperative landscape

at the meso level (Weible et al., 2011). I assume that significant historical developments at the case site may qualify as macro-level developments that would impact cooperation.

The lack of conservation research looking at historical context may reflect difficulties in directly assessing this relationship. It is likely that indicators or proxies for history's influence are necessary, as pragmatic alternatives to measuring changes in social variables like cooperation and beliefs over long time periods. Narratives are an indicator that can be measured at one point in time without requiring a longitudinal analysis and provide a logical link between historical context and individual behaviour. Narratives often resemble explanatory stories, such as 'the landscape used to be better managed, but now has been left to go wild allowing wolves to return and attack the sheep'. Narratives are understandings of causality that are formed by stakeholders' lived experiences and learning (Dahlstrom, 2010). They are the means through which individuals structure and communicate their understandings of problems such as HWC, and justify their actions (Shanahan et al., 2011). For example, evolutionary models have shown that narratives can act as coordination devices by facilitating the emergence of trust and cooperativeness among stakeholders (Gokhale et al., 2022). Narratives may exert this influence on cooperation and other behaviours via influencing beliefs (Dahlstrom, 2010). Different coalitions based on policy core beliefs have been shown to utilise different narratives, and coalitions with consistent narratives among their members tend to be more successful than their competing coalitions (Shanahan et al., 2013).

Historical narratives are stories about the past, with a causative understanding of how the past led to the present. Shared historical narratives have also been shown to be capable of promoting cooperation among stakeholders, by providing a conceptual model that tends to arrive at specific conception of problem understandings and consequent solutions (McAfee et al., 2020). Historical narratives are appealing as an indicator of the influence of history because they draw on the unique experiences of the stakeholders from whom they are measured. Without in-depth and accessible historical literature on a place, stakeholders' narratives might be the best approximation of causative links between historical context and cooperation in the conservation and management of wildlife. I therefore chose to draw upon the historical narratives of the stakeholders themselves to answer SQ3; after all, they are the experts in how their and their community's history has shaped the present context they inhabit.

This research defines 1) stakeholders' beliefs and 2) historical narratives as the independent variables influencing conservation cooperation in the case study area. In brief, the following preliminary hypotheses are derived for testing, subject to iterative change based on the field research:

- H1. Stakeholders are organised into cooperating coalitions.
- H2. Coalitions will consist of stakeholders with shared policy core beliefs, possibly despite conflicting deep core beliefs.
- H3. Stakeholders will hold differing historical narratives; those who share historical narratives will also share core beliefs, and therefore advocacy coalitions will also share historical narratives.

3 Methods

To answer the three research questions, I took a three-step approach using a case study strategy. First, I used SNA to make a stakeholder cooperation network and look for coalitions. Second, I used qualitative content analysis (QCA) to extract stakeholder’s beliefs, and SNA to relate them to coalitions. Third, I used QCA to extract stakeholders’ historical narratives, and SNA to relate them to coalitions and beliefs. An overview of these steps is illustrated in Figure 3. Below I describe the operationalisation of the concepts, the case study selection, the data collection methods, and the analysis for each of the research questions. Each sub-section address a specific sub-question on cooperation, beliefs, and historical narratives, in that order.

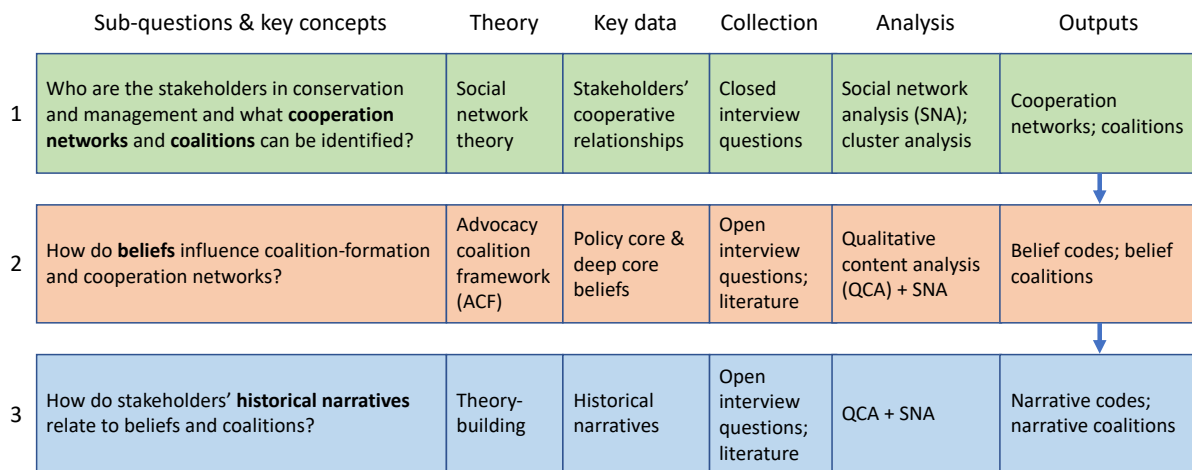


Figure 2 Research flow.

The theories, data, methods, and deliverables needed to answer each research sub-question.

3.1 Operationalisation

3.1.1 Stakeholders, cooperation, and coalitions

Stakeholders are those organisations and individuals who influence or are influenced by a given system (Leventon et al., 2016). To answer sub-question one, they were operationalised by their stake and the type of organisation. Although stakeholders can have multiple stakes, in this case study I considered only those that have a clear influence in either wolf conservation and management, or stakeholders suffering damages from wolves or boar (livestock losses, crop losses, property damage) (Kovařík et al., 2014). The four clear influences were: 1) direct interventions in wolf or boar populations (hunting, feeding, protection) (Kutal et al., 2016); 2) creating or implementing relevant policy (forest management, compensation for damages, agricultural subsidies) (Kutal and Dula, 2020); 3) advocating or contributing to local discourse on the issue (e.g., for or against coexistence with wolves) (Kutal et al., 2018); and 4) electing local officials that share their beliefs (e.g., on the right population size of boar). Thus, these are the stakes deemed most relevant to cooperation in conservation and management.

*Cooperation*² is a social interaction whereby stakeholders work together to address a collective action problem, often demanding a common understanding of the problem and the objective (Gardner, 2005). In this case study, I considered cooperation between stakeholders for the purposes of conservation or management of wolves and boar, or for the management of HWC.

² During the fieldwork, the dependent variable was adjusted slightly from stakeholder collaboration to cooperation, due to common negative associations with the translation in Czech (*spolupráce*), as in ‘collaborating with a repressive regime’.

Stakeholders can cooperate by sharing information (wolf and boar locations and sightings, best practices for securing sheep, identities of poachers); working together on drafting and implementing relevant policy (HWC compensation and subsidies, forestry, agricultural, land-use zoning); and coordinating or participating in projects or events (hunting or poaching, wolf surveys, genetic studies, dialogues, workshops) (e.g., Lam et al., 2021). Stakeholders' cooperative relationships (ties) were operationalised by 1) the function of the cooperation as described above; 2) the self-reported strength of the cooperation (e.g., Lam et al., 2021); 3) coalitions of cooperating stakeholders; 4) betweenness centrality; and 5) density.

A *coalition* is a small group of stakeholders that cooperate preferentially (or exclusively) within-group. They can be a mix of different types of stakeholders, e.g., farmers and hunters. Coalitions are operationalised as network clusters, whose member stakeholders are identified using cluster analysis (Borgatti et al., 2018; Glover, 1989). Betweenness centrality is a measure of how often a stakeholder connects other stakeholders that would otherwise be disconnected. Stakeholders with higher betweenness centrality, known as bridging stakeholders, are important in promoting cooperation between separated stakeholders, and can provide opportunities for cross-coalition engagement and collaboration (Freeman, 1978; Lam et al., 2021). Density is measured by dividing the number of ties to a stakeholder or part of a network by the maximum possible number of ties that could exist (Hanneman and Riddle, 2005). This provides a simple comparative measure of how much cooperation is occurring involving a stakeholder, coalition, or other part of the network. Belief coalitions and narrative coalitions are coalitions with members found to be consistent in sharing similar beliefs or narratives internally, and not sharing the beliefs of other coalitions.

3.1.2 Beliefs

To address the second sub-question, I considered stakeholders' beliefs in my case study that relate to the conservation and management of wolves and boar. The beliefs were operationalised by 1) the level of the belief in the ACF; 2) the content of the belief; and 3) the prominence of the belief relative to others. Beliefs were identified through stakeholders' responses to certain themes of questioning based on illustrative components (Sabatier, 1988, 1998) and my own observations.

The three levels of belief in the ACF are secondary aspects, policy core beliefs, and deep core beliefs. *Secondary aspects* were measured by stakeholders' responses to the performance of specific institutions (e.g., subsidies for protecting sheep from wolves are (in)sufficient) or from perceptions of the relative importance of different parts of a problem (e.g., the spread of African swine fever is more serious than boar-damage to crops) (Sabatier, 1988, 1998). *Policy core beliefs* were measured by stakeholders' responses to questions concerning problem framings (humans or animals are to blame for HWC), solutions (hunting or conservation), and policies (support sheep farmers or establish national parks) (Sabatier, 1988, 1998). *Deep core beliefs* were measured by stakeholders' responses to questions concerning the nature of man's place in nature (domination or mutualism) (Manfredo, Teel, Carlos, et al., 2020); the ideal landscape (wilderness or cultural landscape) (personal communication, April 4, 2022); or their relative priority of values (equality, autonomy, beauty, respect) (Sabatier, 1988, 1998). Stakeholders could refer to more than one belief within the same theme (e.g., solutions to HWC include both increased hunting and compensation for damages). Therefore, the prominence of a belief in relation to others within the same theme was measured by the frequency with which a belief was mentioned by a stakeholder (and recorded in the interview transcript). More prominent beliefs were assumed to be more influential in stakeholders' decisions about whom to cooperate with.

3.1.3 Historical developments and narratives

In this case study I considered historical developments affecting the case site from 1989 to 2022. In this way, it was possible to ensure that the developments would be in living memory of most stakeholders. This variable was not fully operationalised and was open to the inclusion of developments from the local to the global scale, provided that there was a reasonable causative explanation for how this development could influence the conservation and management of wolves or boar, or stakeholder cooperation therein, at the case site. Such developments could for example include significant shifts in land-use patterns and wildlife populations that alter stakeholders' relationship with the landscape; changing institutions that govern or regulate that same relationship; and socio-economic changes that influence nature-related values (Horcea-Milcu et al., 2018; Manfredi et al., 2021; Rode et al., 2021).

Historical developments were partly operationalised using stakeholders' own narratives explaining the influence of historical events on the present conservation and management context at the site, or in other words, their understandings of how their past has led them to their present. There was little research to reference for historical narratives (e.g., Dickman, 2010), and they were therefore left open to interpretation during iterations of the data collection and analysis, to permit unexpected results. Stakeholders were asked to explain how they thought 'history' was important in the conservation and management of wolves and boar at the site, and the question was left open-ended. This was to keep the analysis open to unexpected observations and results. If they struggled to answer, they were asked in the first instance to think of only the last 'thirty-or-so years'; second, they were given prompts such as 'you mentioned earlier that forest cover has changed, could you perhaps elaborate on that?' to expand on narratives that had already surfaced; and third, they were directly asked how they thought historical developments might be influential in on specific types of cooperation discussed earlier in the interviews.

Stakeholders' narratives were measured by 1) the content of the narrative (Shanahan et al., 2011); 2) the prominence of the narrative relative to others; and 3) the frequency of the narrative among all stakeholders. The content of the narratives usually implied causation, e.g., increased forest cover has led to higher populations of wolves and in response conservationists have had to cooperate more widely to track the population. Narratives of similar causation were grouped together (Shanahan et al., 2011). Similar to beliefs, stakeholders were able to refer to more than one narrative. Therefore, the prominence of a narrative was measured by the frequency with which it was mentioned by a stakeholder (and recorded in the interview transcript). Some narratives were repeated by more stakeholders than others. The more common a narrative is, the more likely it is to interact with beliefs and decisions about cooperation (Shanahan et al., 2013). Therefore, the research focussed on those narratives referred to by at least two stakeholders, including one member of a coalition. This narrowed the analysis to only the narratives most likely to have a relationship with cooperation, if any, and reduce the time spent on uncommon narratives unlikely to have influence.

3.2 Research strategy

The research strategy followed a realist philosophy, which is a form of theory-driven evaluation that usually seeks to answer the question 'what works for whom and in what circumstances?' (Hewitt et al., 2012, p. 252). The realist approach provides a middle ground between positivism and interpretivism, which was useful in combining established theory (the ACF) with unexplored phenomena (history in conservation cooperation). This approach is useful for

understanding how contexts such as local history influences the mechanisms of complex social phenomena such as beliefs and cooperation (Hewitt et al., 2012).

The overall research strategy is a single-case study of the conservation and management of wolves and boar in the study area in January and February of 2022. Case studies are suitable when the focus is to answer ‘how’ questions (Baxter and Jack, 2008). A classic case study is defined as “an intensive study of a single unit for the purpose of understanding a larger class of (similar) units” (Gerring, 2004, p. 342). This research aimed to explore the proposed causal relationship between the independent variables (historical developments and beliefs) and the dependent variable (cooperation) in a single illustrative case, rather than using a comparative case, and therefore its inferences are less generalisable to the wider class of shared landscapes containing HWC and conservation conflicts (Seawright and Gerring, 2008). This strategy was chosen firstly for its suitability for drawing qualitative data on historical narratives and beliefs, and secondly methodological qualities uniquely suited to the context specific research objective aiming to generate empirical data (Gerring, 2004). As discussed, the literature on conservation conflict and cooperation is underdeveloped, and empirical evidence of comparable cases is lacking (e.g., Redpath et al., 2013). Therefore, this research aimed to explore and interpret a novel case in-depth and derive new insights from the analysis. Case study methods fit this purpose by capturing the complexity and particular nature of the chosen case without testing pre-existing theory (Stake, 1995). Furthermore, a single case was chosen to achieve better depth of interpretation of the phenomenon and pattern recognition than could be achieved through multiple cases, which are more useful for recognising overall patterns (Leonard-Barton, 1990). Additionally, single-case studies are more useful for establishing cause and effect (in this case the relationships between cooperation, beliefs, and narratives) than are multiple case studies, which can confuse cause and effect (Leonard-Barton, 1990). It is important to note that the case study is not based on temporal variation despite the attention to historical developments, as it aimed to explore the influence of these developments on contemporary cooperation in 2022, rather than change in that cooperation over time.

The goal of the case study was to explain the dependant variable, the phenomenon of cooperation among stakeholders regarding wolf conservation and boar management. It aimed to do this by exploring the role of stakeholders’ narratives of historical developments as the first independent variable, and that of stakeholders’ beliefs as the second. Beliefs, as understood by the ACF, are hypothesised to inform stakeholders’ choices concerning cooperation. Narratives are hypothesised to influence beliefs and thereby influence stakeholders’ cooperation. The unit of analysis is therefore social phenomenon of cooperation interactions, and the unit of observation is the individual stakeholder. Thus, the desired context for the case study was firstly a site with complex HWC problems accompanied by underlying human conflicts involving multiple stakeholders. These conflicts do not imply the existence of cooperation, rather cooperation may or may not occur within this context. They are not the same variable, nor are they mutually exclusive. Secondly, the context includes significant historical developments of different kinds that are reasonably expected to be influential in forming beliefs relevant to conservation conflicts. These developments should be within living memory to facilitate data collection from stakeholders.

3.2.1 Case study selection

The case study site was selected based on the case study context of HWC and conservation conflict, and the independent variable of historical developments. Possible influences of specific historical developments on stakeholders’ beliefs were posited. The value of the dependent variable (cooperation) was not known in choosing the case. The context and

historical developments of the case study are outlined below. The site straddles the border shared by Czechia and Slovakia in the outer western Carpathian Mountains (Figure 3), consisting of the administrative districts of Frýdek-Místek, Nový Jičín, and Vsetín in Czechia, and neighbouring Čadca in Slovakia. Much of the Czech part of the site is part of the Beskydy Protected Landscape Area (PLA), which is bordered by the Kysuce PLA in Slovakia.

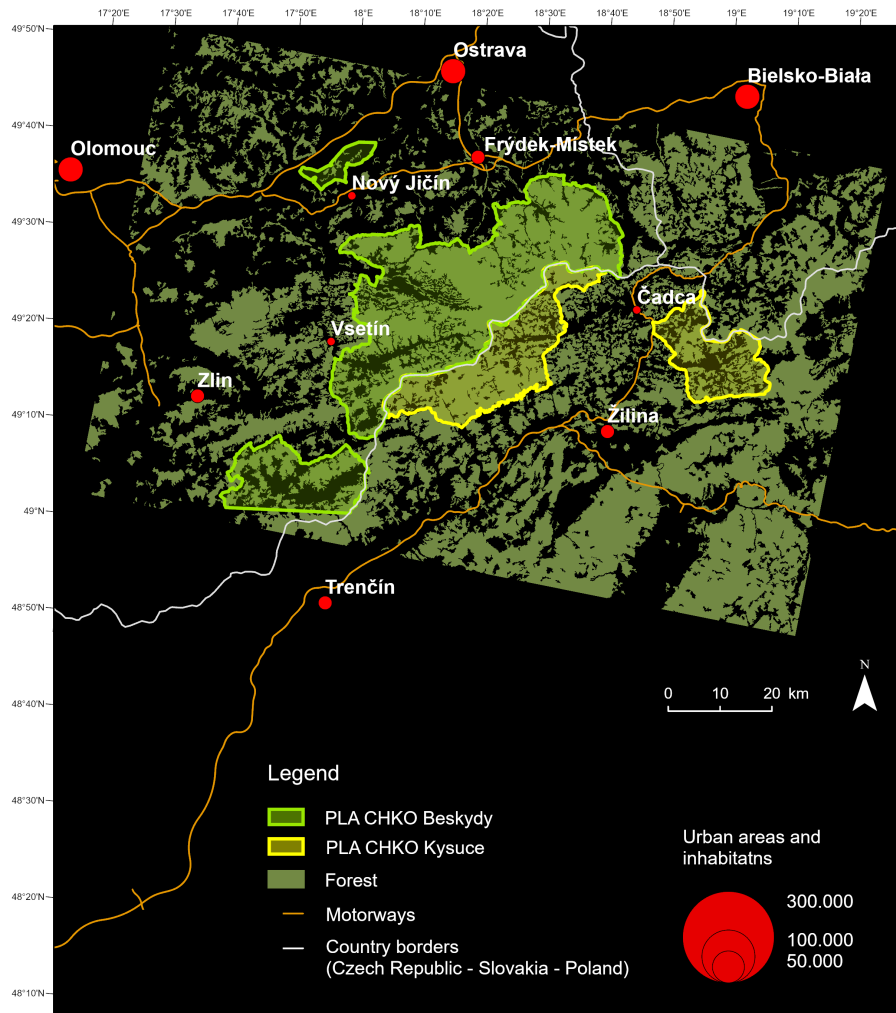


Figure 3 The case study site.

The map displays the districts of Frýdek-Místek, Nový Jičín, and Vsetín in Czechia, and neighbouring Čadca in Slovakia, indicated by the cities of their administrative seats. The two Protected Landscape Areas (PLAs) covered most of the site, their borders are highlighted. Forest cover data is from Copernicus' CORINE Land Cover.

HWC and conservation conflict

These 4 districts are firstly host to a suitable context of HWC, revolving around the grey wolf (*canis lupus*) and the wild boar (*sus scrofa*). This region is a shared landscape with mixed land-uses alongside high levels of biodiversity (Feranec et al., 2000). It is the western-most extent of the Carpathian populations of large carnivores including wolves, bear (*ursus arctos*), and lynx (*lynx lynx*) (Kutal et al., 2016). Wolves and boar are two species frequently involved in HWC (König et al., 2021), and were the two species at the centre of the great majority of HWC at the case site. HWCs involving wolves and boar were therefore chosen as the focus for the case study. Both of these species cause economic damages and are perceived by some to pose a risk to human safety (Kutal et al., 2018). Wolves sometimes prey on sheep, incurring economic costs and often causing distress on sheep farmers (Kovařík et al., 2014). They are

also seen as competing with gamekeepers for ungulates including deer, though this is contested by ecological studies (Kutal et al., 2016). Wolf populations sometimes struggle to navigate a landscape fragmented by infrastructure and are sometimes hunted illegally (poaching) (Hulva et al., 2018). Boar incur economic losses to farmers and landowners by rooting up fields and gardens, eating crops and produce, and sometimes damaging fencing and partitions (Ficetola et al., 2014). In addition, there is a risk that boar will transmit a novel African swine flu to domesticated pigs, which is expected to be disastrous for the pork industry (Cwynar et al., 2019; O'Neill et al., 2020). Boar are a traditional game animal in the area, and are widely hunted both for sport and population control (Melis et al., 2006).

The site also had a suitable context of conservation conflict underlying the HWC. There is a conflict of beliefs concerning the level of protection afforded to the wolf, involving two main perspectives. In general, sheep farmers and gamekeepers believe there should be greater freedom to deal with the wolf using lethal control, particularly for what they see as problematic individuals. Conservationists, on the other hand, believe the wolf should be protected despite the damages. There is a conflict meanwhile over the appropriate management of the population of wild boar. Gamekeepers are traditionally responsible for this management, but clash with farmers and other stakeholders over the ideal population size.

The two species were included together rather than as separate cases, because the focus of the analysis was social rather than ecological. It emerged that there was considerable overlap among the stakeholders and the conservation conflicts related to each species, and therefore to analyse cooperation it was more suitable to combine the stakeholders in networks rather than separate them. Studying a predator and an ungulate together gave greater breadth to the range of cooperative relationships available for analysis, and also provided a greater diversity of beliefs and narratives from stakeholders, which is beneficial for the exploration of relationships between variables.

Historical developments

The four districts secondly had a suitable context of historical developments that were expected to have influenced stakeholders' beliefs in relation to the conservation and management of wolves and boar. These included institutional change, changes in land-use and land cover, socio-economic changes, and changes in the distribution of wolves and boar. Many of these changes came in the wake of the Velvet Revolution (1989) which saw the fall of the Czechoslovak Socialist Republic (1948-1989) and are therefore within the living memory of many stakeholders (Glenn, 1999; Šerek et al., 2014). These developments are outlined below, along with explanations for their influence on beliefs and/or cooperation.

The Revolution saw the turnover of the ruling coalition and consequent transition in political beliefs from socialism to capitalism, a shift in socioeconomic conditions, and developments in stakeholders' relationships to the landscape. The most visible effect on the case site came from Czechoslovakia's entrance to the open market. Under the process of restitution, agricultural lands that were collectivised under socialism were restored to the original owners or their descendants (Swain, 1999). Farmers who had previously had little stake in the productivity of the land were now owners and exposed to the pressures of the free market. This may have instigated a shift in their relationship with the land, which in turn influenced their beliefs regarding their place in the landscape and the species in it (Breyne et al., 2021). The land now needed to be productive and competitive with international standards, beginning the process of agricultural modernisation. Capitalist and modernist beliefs would reduce farmers' tolerance for wolves taking sheep in Čadca and boar tearing up fields in Frýdek-Místek, Nový Jičín, and

Vsetín, and they may have begun to view see these animals as pests rather than a natural part of the landscape (Rode et al., 2021). On the other hand, the Revolution also marked the emergence of the environmental movement in Czechoslovakia, which had been suppressed under the socialist regime (Konvička and Kavan, 1994). This was characterised by the establishment of non-governmental organisations (NGOs) advocating for stronger environmental protection, in response to a perceived deterioration in the environment under socialism (Konvička and Kavan, 1994). One of the first NGOs was Hnutí DUHA (*'The Rainbow Movement'*), which quickly eclipsed the others in size and importance (Fagin, 2000). Hnutí DUHA opened the first of many branches in Olomouc, a city near the eastern border of the study site and began working in the districts of the case site. This and other NGOs believed in the value of Czech nature and wildlife and launched wolf conservation initiatives in Čadca and later in Frýdek-Místek, Nový Jičín, and Vsetín (personal communication, Hnutí DUHA, Feb 1, 2022).

The 4 districts of the case site have seen dramatic landscape changes since 1989, possibly altering the human relationship to the land and wildlife. Some of these changes are associated with the post-socialist processes of agricultural modernisation, particularly the replacement of traditional pastures with crop monocultures. Although land tenure was returned to individual farmers and families, in these districts many of the old socialist collectivised farm boundaries were maintained when the farmers established agricultural cooperatives to farm and market their produce (Swain, 1999). Meanwhile, the traditional sheep-grazing was replaced in some areas with cattle grazing, requiring more use of fertilisers. Monocultures, cattle farming, and increased urbanisation and development driven by population growth and tourism have all contributed to an altered landscape, resembling less and less the cultural landscape characterised by upland sheep pasture. As cultural landscapes decline so too are stakeholders' traditional beliefs eroded and succeeded by modern and capitalist beliefs (Horcea-Milcu et al., 2018).

The populations of wolves and boar have fluctuated at the case site over time, possibly influencing stakeholders' beliefs related to them. One reason for this was the process of land abandonment and afforestation particularly in the years 1990-2000, which provided habitat for ungulates and their predators, particularly wolves (Hulva et al., 2018). The wolf has been present in Slovakia continuously in modern times, but only returned to Czechia in 2014 after an absence of over a century (Kutal et al., 2016). This development is part of the wider 'comeback' of large mammals in Europe, of which the wolf is a forerunner (Chapron et al., 2014). It is possible that the wolves' long absence and subsequent return to the Czech districts may result in negative beliefs towards it due to stakeholders being unused to coexisting with a large carnivore. This may depend on the depth and the rate of change of the relevant beliefs. A possible alternative is that a value change debt may mean that traditional beliefs towards the wolf will have persisted in the cultural landscape (Horcea-Milcu et al., 2018; Manfredo et al., 2016). Meanwhile populations of wild boar in the outer western Carpathians have been growing steadily since the post-war period (Melis et al., 2006; Broz et al., 2021). Afforestation and the recent increase in monocultures have apparently led to a significant increase in numbers of boar in recent years, leading to policy changes regarding their population management.

3.2.2 Generalisability

The research has high internal validity and low external validity to other conservation conflicts. The researcher acknowledges that while a single case study provides high internal validity, there is a trade-off in external validity, reducing the scope for generalising the research conclusions to other cases of stakeholder cooperation and conservation conflict (Baxter and

Jack, 2008; Leonard-Barton, 1990). The research went into depth on the context and social factors specific to the case study site, and the greater the depth of analysis, the greater the understanding and insight of this particular case. This allowed detailed conclusions to be drawn from the research about the site, which could promote improved cooperation in the conservation and management of wolves and boar. The specificity of these conclusions meant that insights into the relationship of the variables can be only superficially applied to other cases, but can also demonstrate the usefulness of further research into this relationship. Other limitations of the single-case design relate to data-gathering and include the risk of inefficiency by producing a large amount of unusable data, and the risk of reduced objectivity that results from deep involvement in the analysis leading to unconscious bias (Seawright and Gerring, 2008).

3.3 Data collection

A mix of quantitative and qualitative data was collected from the case study primarily through face-to-face interviews with stakeholders. Cooperation is a social interaction between stakeholders, or in other words a network, and can be understood using SNA (Lam et al., 2021). Quantitative data on cooperative relationships was therefore needed to understand cooperation (SQ1). This data from interviews allowed for the consistent explanation of operationalised cooperation, as well as the opportunity to better understand stakeholders' reasoning behind their cooperative relationships. Beliefs and narratives are necessarily subjective, and their qualitative content was needed to fully answer SQ2 and SQ3 respectively. Once QCA was performed, it was possible to include the results with those of the SNA, and thereby combine the quantitative and qualitative elements. Semi-structured interviews were chosen for their flexibility considering the exploratory nature of the research, and that some key concepts were not operationalised in full. is largely exploratory. Also, the interviews allowed the researcher to identify unanticipated areas of interest, and even adapt the approach in response to engagement with the stakeholders (Leventon et al., 2016). The following sub-sections outline the choices made in the sampling, the interview design, the interview questionnaire, and issues of consent.

3.3.1 Sampling

It was important to obtain a sample representative of the diversity of stakeholders involved in the conservation and management of wolves and boar. An initial list was made based on likely stakes, including:

- Gamekeepers: licensed hunters responsible for managing wild boar population; many lobby against the protection of wolves.
- Farmers: the most affected by damages from wolves and boar, can contribute to advocacy and habitat changes. Can be sub-divided into smallholders, particularly sheep farmers, distinct from larger industrial or cooperative farms.
- Local government: Administrations that design or implement relevant policy, including agricultural subsidies, land-use, HWC compensation.
- Conservationists: Mostly NGOs that educate and advocate for wildlife and participate in ecological research.
- Foresters: local branches of the national forestry organisations (LCR and LSR), responsible for administering commercial forestry plantations that include wolf and boar habitats.

I considered both organisations and individuals as stakeholders, rather than one or the other. The sample contained 17 organisations and 4 individuals. The research originally sought to

identify stakeholders exclusively on the level of organisations, as cooperation was expected to take place mostly on the organisational level as is common in wildlife conservation and management (Ahmadi et al., 2019; Grossmann et al., 2020; Lam et al., 2021). However, an unanticipated feature of the stakeholder landscape was that most participants were members of two or more organisations, sometimes splitting their time equally between their responsibilities (see Appendix 2 for the affiliation network). For example, participant 8 (P08) is an academic, a member of several conservation NGOs, and a local government representative, who describes their main aim as (“the stabilisation of the local wolf population and the improved coexistence of locals and wolves”; personal communication, February 3, 2022) as being distinct from his other roles (see table 2). It was more important that this individual and others with similar characteristics responded to the interviews from their own perspective rather than that of an organisation, because 1) their cooperative relationships existed outside of any one of their organisations, and 2) their decision-making about cooperation was therefore more likely driven by personal beliefs (and narratives) than those of an organisation. Participants representing organisations, on the other hand, were made aware that their responses would be attributed to the organisation they were representing.

I first reached out to request interviews with stakeholders with a ‘helicopter overview’ of the case site and context, to identify other stakeholders for the sample (cf. Hajer, 2005, see Van Herten and Runhaar, 2013). Stakeholders that I expected to have an overview of the stakeholder landscape included the administrations of the two PLAs, the hunting associations (‘OMS’) responsible for each district, the Czech Private Farmers’ Association (‘ASZ’), and the project coordinator of Hnutí DUHA’s large carnivore conservation initiative. This technique was used to mitigate the bias that could arise from beginning with stakeholders with a narrow focus and network of contacts. These stakeholders may have also represented specific stakes leading to biased overviews, however. Therefore, all interview participants were also asked to name other actors that they knew of in wolf conservation or wild boar management, to check for missing stakeholders. Following the initial overview interviews, I approached newly identified stakeholders through a snowball sample.

From the 34 stakeholders contacted, 13 declined. Stakeholders without a referral declined more often. The main reasons for declining were stakeholders being too busy, concerns relating to privacy, or reluctance to engage with research that could be perceived as benefitting wildlife at the expense of locals. Referring to the latter, I estimated that approximately nine out of 13 declines were from gamekeepers and farmers, who are the groups most likely to be opposed to wolf conservation (Kutal et al., 2018). These were also the two largest groups of potential stakeholders, and it was therefore likely that there would be more declines from them. Despite these rejections, I interviewed more than one participant from each stake and therefore the rejections produced less bias in the sample.

The sampling method produced a substantial variety of contacts, so potential candidates were prioritised according to the selection criteria below, in order of importance:

1. Participants were only considered if they met the research definition of stakeholder in wolf conservation or boar management;
2. Stakeholders were sought in areas where there were reports of HWCs including sheep taken by wolves and damage to land caused by boar in the last four years;
3. Representatives were sought for each of the initial stakes described above;
4. After the first round of interviews, referrals by two or more distinct participants warranted a new stakeholder being contacted for interview. This was to limit the number of stakeholders explored, since 1) more contacts were given than could

realistically participate; and 2) a stakeholder with more than one referral was more likely a part of a cooperation network.

Redundancy in the sampling (no new stakeholders being identified) was interpreted as indicating that a representative sample of stakeholders had been achieved. All of the initial list of stakes had been covered by several representatives, and additionally at least one representative for each stake was interviewed in both Czechia and Slovakia (Table 1). More stakeholders were interviewed in Czechia because it presented a larger area, was more densely populated and had more stakeholders involved in wolf conservation.

Table 1 Breakdown of the 21 participating stakeholders' attributes.

Stakeholders with more than one stake in wolf conservation and boar management indicated their primary stake.

PLA = Protected Landscape Area, CZ = Czechia, SK = Slovakia.

<i>Stakes/interests</i>		<i>Type</i>		<i>Country</i>		<i>Species</i>	
Farm/farmer	5	Local authority	7	CZ	14	Wolves and boar	12
Conservation	3	Private business	5	SK	6	Wolves only	9
Gamekeeper	3	Private individual	4	Both	1		
Local govt.	3	Association	2				
PLA	2	NGO	2				
Forestry	2	State administration	1				
Consultancy	2						
Tourism	1						
<i>Org. size</i>		<i>PLA Status</i>		<i>Age range</i>		<i>Gender</i>	
Individual	4	Yes	16	<30	1	Male	15
2-10	4	No	5	30-40	11	Female	3
10-50	10			40-50	7	Both	3
50+	3			>50	2		

3.3.2 Interviews

Twenty-one in-person, semi-structured interviews were conducted in Jan-Feb 2022, with the help of two translators for interviews in Czech and Slovak to English as the main research language. Interviews took between one and two hours. In addition, four interviews were conducted online using Zoom because of COVID-19 restrictions and logistical constraints. The interview guide (Appendix 1) followed the logical structure of the research questions and was divided into four parts with a mix of closed and open-ended questions, depending on the type of data being collected.

Part 1 briefly introduced the researchers, the project, and the interview process; collected basic information about the stakeholder; and asked for informed consent to participate in the interview, for part 3 to be recorded, and additionally for the signature of a witness to the consent.

Part 2 sought to define the participant's stake in wolf conservation and/or boar management, identify other stakeholders, and identify cooperative relationships. This data was later used to establish the networks. These questions required only short responses from limited options, and so used closed questions. Responses were recorded in writing on the questionnaire sheet. Questions for stakeholder identification and characterisation were adapted from Leventon et al. (2016). After defining their own stake from a list of possibilities, the participants identified

other stakeholders and their stakes. The participant then indicated which of these stakeholders (if any) they cooperated with, and characterised what, how, and why they cooperated. The participant additionally scored the strength of these cooperative relationships as ‘good’, ‘okay’, or ‘bad’, each of which was assigned values on a Likert scale (e.g., Levi and Williams, 2013)

Part 3 sought to extract stakeholders’ beliefs and narratives concerning historical developments in relation to wolf conservation and boar management. Beliefs and narratives are complex data that were not limited to a set of options beforehand, so that unanticipated responses could be explored and included in the research. Therefore, this section consisted of longer open-ended questions designed to guide a flexible conversation. The different types of beliefs required different techniques for identification. Secondary aspects and policy core beliefs were identified in responses to questions concerning practices, problems, and solutions. Stakeholders were for instance asked what the problems in context of wolves and boar were, and it was left to them how to define the problems and solutions. Deep core beliefs were more difficult to identify, likely because they are often unconsciously held by the participant (Weible et al., 2011). Historical narratives were also at times difficult to draw out. Therefore, open-ended questions about practices, problems, solutions, wildlife, cooperation, historical developments and changes were followed up with ‘why’ questions that encouraged stakeholders to reflect on their reasoning, and thereby reveal their underlying deep core beliefs or narratives. *Part 3* (only) was recorded with the participant’s permission using a mobile phone recording app and in accordance with informed consent guidelines (see 3.5.2. below). For online interviews, recording was done using Zoom’s recording feature.

Part 4 sought the participant’s permission to be contacted again in the future for further research.

Where possible, literature sources were used to substantiate participants’ beliefs and narratives after interviews, and to bolster the qualitative content analysis. Scientific literature on wolf and boar ecology, conservation and management practices and policies, and interactions with humans in both Czechia and Slovakia was used to triangulate interview responses regarding practices, problems, and solutions. Historical narratives were triangulated using historical literature on political and policy change, land-use and tenure, ecosystem changes. Literature was not used to triangulate cooperation information, due to lack of availability. The reporting from each side of a cooperative tie instead provided reliability.

3.3.3 Informed consent

Informed consent to participate in interviews was sought from each participant using culturally appropriate means, following a similar method to Dorresteyn et al. (2016) and Dorresteyn et al. (2017). Participants were informed about the research, how their data would be handled and anonymised, and that they could withdraw from the interview at any point if they felt uncomfortable. Verbal consent to participate is included in the interview recordings, and each interview was conducted in the presence of a witness of consent. The name of the witness and their relationship to the subject was recorded on the interview guide sheets. This procedure was approved by the Ethics Review Board of the faculties of Science and Geosciences at Utrecht University (reference Geo S-21584). Recordings were uploaded to the Utrecht University secure server, to be stored for 10 years as per GDPR policy.

3.4 Data analysis

The analysis consisted of a mix of quantitative and qualitative methods. Quantitative network analysis was applied to the data derived from closed interview questions to understand the

stakeholder cooperation landscape (SQ1). Qualitative content analysis was applied to the data derived from the open-ended questions to identify stakeholders' beliefs (SQ2) and historical narratives (SQ3), which were combined with the network analysis to understand how beliefs and historical narratives influence cooperation.

3.4.1 Cooperation

This section explains how data on cooperation was used to build and analyse networks. Responses to the closed interview questions were compiled in a spreadsheet and provided the basis for cooperative relationships in cooperation networks, including the strength of the ties. It emerged that cooperation occurs both within and across the international borders, so distinct cooperation networks were made for stakeholders from each of Czechia and Slovakia, as well as for both combined. Twelve participants had a stake related to both wolves and boar, while nine had a stake related to wolves only. This was an unexpectedly high level of overlap between stakes in the two species, and so networks were made for each species individually, as well as a combined network. No network was made for boar-related stakeholders since all participants were either stakeholders in wolf conservation or both wolf conservation and boar management.

Identifying cooperation networks

Network graphs were used to aid in answering SQ1, with nodes representing stakeholders, and the ties between them representing cooperative relationships. A cooperation matrix depicting the stakeholders' cooperative relationships was exported to the SNA software Ucinet (Borgatti et al., 2002). Ucinet is used to create files that are readable by Netdraw (Borgatti, 2002), the software used to create the networks. This package was chosen for its unique 'spring embedding' multi-dimensional scaling technique for deriving a graphic layout from network data. The graphic layout of social networks is useful for describing and analysing the represented stakeholders and ties. This technique assigns locations to nodes in 2-dimensional space, such that nodes that are more similar are closer together (Hanneman and Riddle, 2005). This allowed me to create network graphs where the distance between stakeholders and their position in the overall network could be interpreted to understand cooperation. To prevent nodes overlapping and make the graphs readable, I also used the setting 'node repulsion' to create separation, and setting 'equal edge length' to make the distances between adjacent objects are similar (Hanneman and Riddle, 2005).

The cooperation matrix was valued to indicate *tie strength* (s) based on stakeholders' reporting of the strength of each cooperative tie on the Likert scale. A valued graph was made by assigning a numerical weight to each cooperative tie, and then using this weight to differentiate values in the published graph. A report of 'good' gave $s=3$, 'okay': $s=2$, and 'bad': $s=1$ (Levi and Williams, 2013). Cooperative relationships (and their strengths) were reported by each stakeholder involved. Double reporting increased the reliability of the cooperation data. To represent two reported strengths with one tie in the network, the cooperation matrix was symmetrised using the average of the two reports to give *average tie strength* (S). The resulting cooperation tie strengths existed on a six-point scale where $S=(0,0.5,1,\dots,3)$, which was depicted in the graphs using line thickness.

Three cooperative relationships had a mismatch in the reports of tie strength from the two stakeholders involved, which may have reduced the validity of these measurements. In case of a mismatch, it was assumed that the tie could not be as strong as the higher report, and therefore the average tie strength was reduced to minimise the inaccuracy of the measurement. If reports were contradictory, such as $s^1=1$ and $s^2=3$, then $S=2$, in other words an 'okay' average strength. In case of no tie at all reported by one of the stakeholders, the missing value was set to zero, so

that the average of the two reports would be calculated as $(x+0)/2$, in other words a value half the strength of that reported by stakeholder X.

Data from the stakeholder characterisation (including stakes) provided the stakeholder attributes in the network graphs (table 1). This data was collated in an attribute matrix, numerated and applied to the cooperation networks in Netdraw.

Analysing cooperation and identifying coalitions

To analyse the cooperation networks, I calculated betweenness centrality and clustering using Ucinet functions (see 2.1.).

Betweenness centrality can be calculated using the ‘Freeman Betweenness’ tool in Ucinet, which provides a measure of the overall network betweenness centrality as well as two betweenness centrality measures for each stakeholder (Appendix 3). Betweenness is a measure of how often a stakeholder falls on the shortest path between any two other stakeholders. Let ‘bjk’ be the proportion of all paths linking stakeholder j and stakeholder k which pass through stakeholder i. The betweenness of stakeholder i is the sum of all bjk where i, j and k are distinct (Freeman, 1979). The normalized betweenness centrality (nBetweenness) is a stakeholder’s betweenness divided by the maximum possible betweenness expressed as a percentage. Betweenness scores often provide strong discrimination, making it relatively simple to then distinguish who the brokering and influential stakeholders are. In this case, the separator was placed wherever there was a more-than-doubling of both betweenness measures between consecutive stakeholders in the list.

Clustering involves the use of an algorithm to identify distinct coalitions within a network based on the distribution of ties, which would otherwise be difficult to tease out. Ucinet’s ‘optimization-correlation’ clustering tool does so by maximizing the correlation between the data matrix X and an ideal structure matrix A in which $a(i, j) = 1$ if nodes i and j have been placed in the same cluster and $a(i, j) = 0$ otherwise (Glover, 1989). A high correlation (Pearson’s) is obtained when the data values are high within-clusters and low between-clusters. The algorithm was run a number of times from different starting configurations to test the robustness of the solution (see Appendix 4). The most frequently recurring and conserved clusters were interpreted as the cooperative coalitions.

3.4.2 Qualitative content analysis

The recorded segments of the interviews were manually transcribed by the translators. Czech and Slovak transcripts were then translated to English using DeepL and stored in Nvivo for QCA. I first read through each transcript without coding any statements, but only taking notes on emerging themes. This was to allow for adjustments to the research perspectives based on stakeholders’ responses.

The QCA of beliefs used a mixed top-down and bottom-up method. Illustrative components of secondary aspects, policy core beliefs, and deep core beliefs (Sabatier, 1998, 1989) were used to guide the coding process from the top-down approach. These components were taken as thematic categories or top-level aggregations of codes. With these in place, two iterations of coding the transcripts were made. The first iteration was exhaustive and coded for each category simultaneously. The resulting codes were sorted into the thematic categories placed within a logical hierarchy. A ‘parent code’ is a higher-level code with lower level ‘child codes’ under it. A hierarchy was created by creating new parent codes to bridge the gap between the ACF-derived themes and the child codes derived from the transcripts. In many cases, these

child codes could also be aggregated within each other to form new parent and child codes. The second iteration of coding was performed quickly, recapping the previous round to catch any statements that were missed, and with the new hierarchy in mind. Based on this second iteration, additional changes were made to the existing codes and hierarchies (see Appendix 5 Appendix 11).

Secondary aspects and policy core beliefs were mainly drawn from interview questions framing the nature of the problems faced by stakeholders, and their preferred solutions. Related to these solutions were policy beliefs regarding who should be involved in implementing them. Deep core beliefs are difficult to change and difficult to identify. They were mainly drawn from the conversational ‘why’ questions, though some themes were more easily identifiable than others. It was also possible to infer deep core beliefs using the coded policy core beliefs, and some of these child codes were duplicated and aggregated towards corresponding deep core beliefs (see Appendix 9). The set of guiding thematic categories used during the coding were populated by references in interviews to varying extents. Of 12 categories applied to the data, 6 were populated with a sufficient number of references to be included in the analysis. These included 1 category of secondary aspect, 3 categories of policy core beliefs, and 2 categories of deep core beliefs (see table 5).

A bottom-up method of QCA was used to identify and analyse stakeholders’ narratives about history and change, leaving the analysis open to any narratives related to historical developments. These data were mostly drawn from interview questions specifically referencing changes and developments, though in practice stakeholders would frequently speak about the past and change without being prompted. Two iterations of coding were used to extract narratives referencing history, change, development, progress, or other narratives implying the passing of time, and these items’ influence on the present. After the first iteration, the codes were grouped and given categories. During the second iteration, more statements were coded and the categories further refined and arranged into a hierarchy. I developed a set of common narratives that were not mutually exclusive but aimed to include the most common lines of reasoning (i.e., the landscape versus institution versus attitudes) underlying stakeholders’ understandings of the influence of the past on the present (e.g. Dahlstrom, 2010).

3.4.3 Belief-coalitions and narrative coalitions

Networks of the coalition stakeholders were combined with 1) beliefs, 2) narratives, and 3) beliefs and narratives to establish relationships between the three variables. Bi-modal networks were used to relate beliefs and narratives to the coalitions. Bi-modal networks are networks with two sets of nodes (stakeholders and specific beliefs or narratives) instead of one (just stakeholders). Only those stakeholders that were part of a coalition identified by the cluster analysis were included, so that the relationship between beliefs and these coalitions could be established. Ties in this case do not represent cooperation, but only link stakeholders to beliefs or narratives, and indicate that a stakeholder holds that belief or narrative. These networks therefore can identify belief coalitions and narrative coalitions.

Belief coalitions

The QCA identified themes, each containing a set of alternative beliefs in response to the theme, e.g., the theme ‘*What is the nature of the problem*’ contained beliefs including ‘*human activity is the problem*’ and ‘*bad cooperation is the problem*’. Six such themes were populated with beliefs from all of the stakeholders (table 5). Only these six were included in the cooperation-belief networks, because the validity of the relationships between beliefs and

cooperation would be reduced if some of the stakeholders had not expressed a belief in that theme.

The networks displayed only each stakeholder's most prominent belief, as these are expected to be the most influential in relation to cooperation. Stakeholders could express multiple beliefs per theme, and in some cases, stakeholders were coded with two beliefs that were expected to be contradictory, such as the deep core beliefs of mutualism and domination. Including all of the stakeholders' expressed beliefs produced bi-modal networks that were heavily connected and difficult to interpret. Some instances had almost full tie density; that is, stakeholders were linked to every possible belief, making it impossible to relate the distribution of beliefs to cooperation. Therefore, bi-modal networks were made using only a stakeholder's most prominent beliefs (see operationalisation in 3.1.). To illustrate, in response to the theme of 'What is the nature of the problem', the conservation NGO CSOP Salamanders transcript was coded with the beliefs 'Animals themselves are the cause' (4 references); 'Bad governance, cooperation, management of HWC' (10 references); 'Beliefs, attitudes, priorities' (1 reference); 'Human activity' (1 reference). Therefore, 'Bad governance, cooperation, management of HWC' was the most prominent belief, and was the only belief included for CSOP Salamander in the network. Since different beliefs are not mutually exclusive, there were cases where a stakeholder had two or more equally prominent beliefs, and links to each of them were included in the network. A spreadsheet function was made to identify the most prominent belief per category for each stakeholder, and these were collected in the matrix used to make the networks in Ucinet and Netdraw.

Narrative coalitions

The QCA identified a variety of narratives of historical developments' influence on current conservation and management of wolves and boar. Of these, nine narratives were referred to by at least two stakeholders, including one member of a coalition (see operationalisation in 3.1.) (Table 6). Narrative coalitions were identified using both the 'most prominent' strategy used for beliefs, as well as by examining all of a stakeholder's linked narratives. Similar to beliefs, stakeholders could express more than one narrative, and gave greater prominence to different narratives. Narratives however were not necessarily as contradictory as beliefs. The most prominent narratives were understood as each stakeholder's understanding of the *most* influential historical development in conservation and management.

3.4.4 Establishing relationships between the variables

A causal relationship between beliefs and cooperation is already established by the ACF, but there is not an established relationship between historical narratives and cooperation. This research aims to confirm the relationship between beliefs and cooperation in this context, before inferring a relationship between narratives and cooperation based on the results.

Coalitions were plotted in networks to understand the nature of cooperation in conservation and management at the case site. Beliefs were added to these networks to test whether coalitions were consistent in their shared beliefs, and whether different coalitions held different beliefs. The spring embedding graphic layout is useful for showing how consistent coalitions are in their beliefs, by placing stakeholders with similar connections closest to each other. Stakeholders with more similar beliefs are placed closest together, so I expected coalition members to be closest together in the graphs. The theoretical framework predicts that policy core beliefs are the stickiest glue that holds coalitions together, and that deep core beliefs and secondary aspects will not be as consistent with coalitions (Sabatier and Weible, 2007). If there was cooperation between stakeholders without shared beliefs, I looked at other possible

explanations, such as geographic proximity of their main offices (Jasny et al., 2019), or functional necessities of their roles (e.g., a local administration responsible for HWC compensation may be mandated to work with specific stakeholder groups including farmers, veterinarians, hunters, and researchers).

The means of establishing a relationship between historical narratives and cooperation is not fully defined, since the aim was to explore this relationship, and new investigations were pursued based on iterations of results. Historical narratives were similarly added to coalition networks, to investigate whether they too show consistency within coalitions and differ between coalitions. If they did, this would establish that they are linked to - and a possible factor promoting the cooperation of - like-minded stakeholders. If there was not clear consistency of narratives and coalitions, then the relationship between narratives and beliefs would be investigated since it is theorised that narratives could influence cooperation through beliefs. To do so, both narratives and beliefs were plotted in network graphs with the coalitions. These graphs were compared to the coalition-belief graphs to see how the addition of narratives changes the distribution of stakeholders and coalitions. If the networks and coalitions became more consistent, then narratives would be inferred to act alongside beliefs to inform cooperation. If the networks and coalitions became more fragmented, then narratives would be inferred to either have an alternative relationship to cooperation, or no relationship. They may relate differently to different levels of beliefs. Narratives may contain elements of policy core beliefs (Shanahan et al., 2011), and therefore be more likely to coincide with policy core beliefs than with secondary aspects or deep core beliefs. If narratives relate to policy core beliefs, they are more likely to correlate with coalitions than if they relate to the other levels of beliefs. The implication is that narratives of historical developments relate to policy core beliefs and therefore also to cooperation. If instead narratives relate to deep core beliefs or secondary aspects, they therefore are unlikely to influence cooperation.

4 Results

In this section, the results are presented in the order of the research questions: 1) the identification of stakeholders, their cooperative relationships and coalitions; 2) an analysis of the influence of beliefs on cooperation; and 3) an analysis of the influence of historical narratives on cooperation. Throughout the analysis, stakeholders are referred to according to their stakes as defined in Table 1, unless where otherwise necessary. This is to aid the reader in understanding the context of the results.

4.1 Stakeholder cooperation in wolf conservation and boar management

This section provides a summary of the identified stakeholders and cooperation network, before analysing the resulting cooperation networks and identifying coalitions. A total of 27 interviews were conducted with individuals representing 21 stakeholders (Table 2 Stakeholders.), of which 17 were organizations and four were individuals. Fourteen stakeholders operated predominantly in Czechia, six in Slovakia, and one, Cons. 2, operated equally in both countries. Twelve stakeholders were involved in both wolf conservation and boar management, while nine stakeholders were involved in wolf conservation only. The organisations varied in size, with most having 10-50 members or employees. Most of the stakeholders were based in either the Beskydy or Kysuce PLAs. Most participants were in their thirties or older (< 30 = 1 participant), and the majority of interviews were with male participants (M=15 interviews; F=3, M and F=3 (interviewed together)).

4.1.1 Cooperation network

The cooperation network provides a detailed description of the cooperative relationships between the 21 stakeholders (Figure 4). In this section I briefly describe the network, its cooperative functions, and the coalitions identified therein.

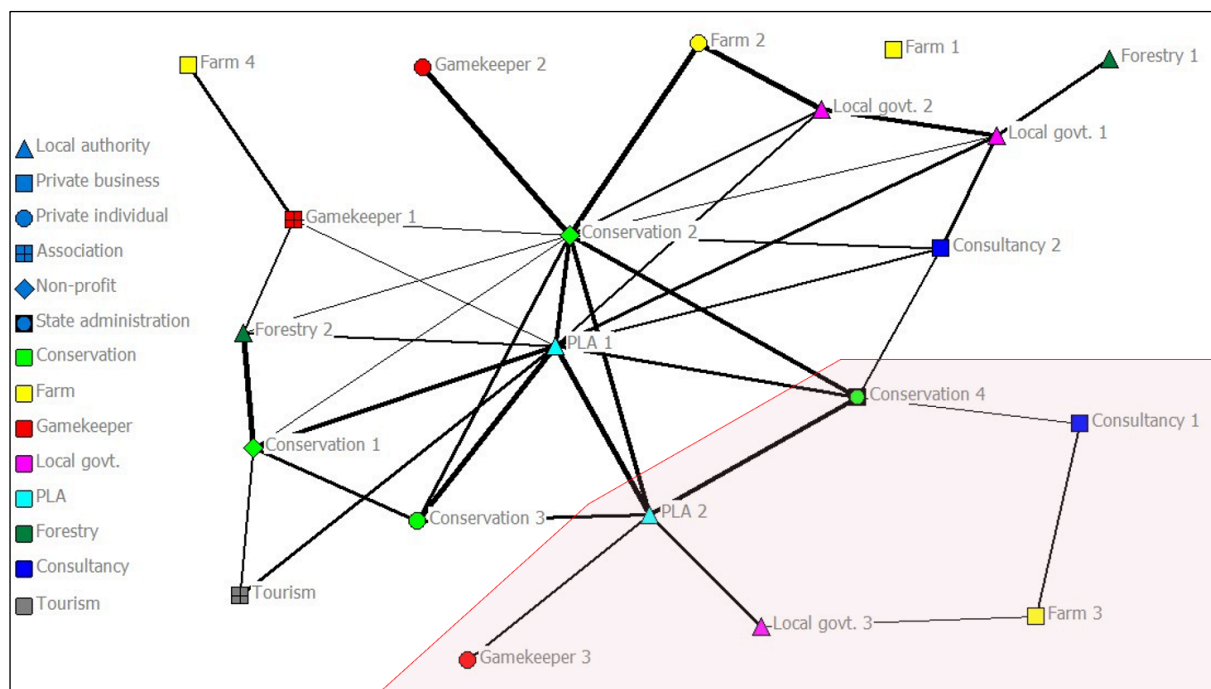


Figure 4 Cooperation network.

Stakeholders in wolf conservation and wild boar management in Czechian districts (white background) and Čadca in Slovakia (pink background); Cons. 2 operated in both CZ and SK, but has local headquarters in CZ. Spatial layout uses spring embedding (nearness = similarity). Node colour = stake, node shape = organisation type. Tie thickness indicates strength of cooperative relationship. See table 2 for stakeholder descriptions.

Table 2 Stakeholders.

Descriptions of the participating stakeholders. Each is assigned a primary stake (e.g., conservation) and then numbered to give the names referred to throughout the text. Select stakeholder attributes are provided. PLA refers to whether a stakeholder operates within one of the two Protected Landscape Areas. Age refers to the age range of the representative(s). Size refers to the number of people in full time employment in the case of organisations.

Stake	Stakeholder	Description	Country	In PLA?	Species	Age	Size
Conservation	1 ČSOP Salamandr	Local non-profit that supports wolves but has shifted focus to cooperating with and supporting sheep farmers.	CZ	Yes	Wolf	30-40	10-50
	2 Hnutí DUHA	Czech branch of the non-profit Friends of the Earth, focussing on monitoring and conservation of wolves. Aims to reduce HWC with large carnivores.	Both	Yes	Wolf	<30	10-50
	3 P08	Mendel University academic, member of several conservation non-profits (incl. Hnutí DUHA), and local representative, whose main aim is the stabilisation of the local wolf population and improved coexistence of locals and wolves.	CZ	Yes	Wolf	30-40	1
	4 ŠOPSR	The Slovak state nature conservation organisation, similar to an environmental protection agency. Responsible for implementing environmental policy and protection of the wolf; no responsibility towards boar.	SK	Yes	Wolf	30-40	50+
P.L.A.	1 Správa Beskydy CHKO	Administration of the Beskydy PLA, responsible for the protection of the ecosystem, protected species, and migration corridors. Activities include conservation, land-use planning, and consulting.	CZ	Yes	Wolf	40-50	10-50
	2 Správa Kysuce CHKO	Administration of the Kysuce PLA, responsible for the protection of the ecosystem, protected species, and migration corridors. Less independent than the CHKO Beskydy, activities include conservation and consulting.	SK	Yes	Wolf	30-40	2-10
Farms	1 Family farm	Small family run farm (livestock and crops) experiencing boar damage, and expecting to lose sheep to wolves soon. Support the lethal control of boar and the protection of wolves.	CZ	Yes	Both	40-50	2-10
	2 P12	A sheep farmer and advocate; active member of the association of sheep and goat breeders (SCHOK) and the Czech private farmers' trade union (ASZ); advocates for the use of protective measures and traditional protection dogs to mitigate HWC	CZ	Yes	Both	40-50	1
	3 RD Čierne	Communist-era agricultural cooperative farming sheep, cattle, poultry, and crops near the planned Kysuce Ecoduct. Supports the lethal control of boar, and supports the presence of wolves.	SK	Yes	Both	30-40	10-50

History, beliefs, and cooperation in conservation

	4	ZD Mír Ratiboř	A large cooperatively-owned industrial farm suffering significant boar damage. Seeking the lethal control of boar and wolves.	CZ	No	Both	40-50	50+
	1	OMS Vsetín	Local district gamekeepers' association, manages local boar population; advocates for lethal control of wolves.	CZ	No	Both	30-40	50+
Gamekeepers	2	P10	A gamekeeper and forester with several organisations, incl. work as an educator for the district gamekeepers association, OMS Frýdek-Místek. Aims to find common interests between forestry, gamekeeping, and conservation by opening channels of communication.	CZ	No	Both	30-40	1
	3	P13	Chairman of a large cooperative industrial farm specialised in dairy, gamekeeper in OPK Čadca, and member of the Slovak Hunting Chamber (SPK).	SK	Yes	Both	>50	1
	1	Město Třinec Env. Dept.	Department within local government administration responsible for assessment of wolf damages for approval of compensation. Voluntarily takes samples for genetic studies by Mendel University, and educates farmers about sheep protection.	CZ	No	Both	30-40	10-50
Local government	2	Obec Bystřice	Local government administration where sheep have been lost to wolves; aims to find a compromise between the conservation of wolves and support of sheep farmers.	CZ	No	Wolf	40-50	10-50
	3	Obec Svrčinovec	Local government office in area of the Kysuce Ecoduct; main activities include advocating for the protection of private land against boar, and educating about the importance of the Ecoduct for biodiversity and particularly wolves.	SK	Yes	Both	30-40	10-50
	1	LS Jablunkov	Local office of the Czech national forestry organisation, and therefore supports the lethal control of boar and the protection of wolves.	CZ	Yes	Both	>50	10-50
Forestry	2	LS Rožnov p. R.	Local office of the Czech national forestry organisation, and therefore supports the lethal control of boar and the protection of wolves.	CZ	Yes	Both	30-40	10-50
	1	Aquabeles s.r.o.	A family-run environmental consultancy engaged in monitoring for the Kysuce Ecoduct and other migration corridors. Members are also involved in gamekeeping, and freshwater quality policy advocacy and activism.	SK	Yes	Both	40-50	2-10
Consultancy	2	Envian s.r.o.	Family-run environmental-agricultural consultancy mainly dealing with mitigating carnivore damages in Czechia, as well as tree-planting and water quality and retention. The owner previously worked for ŠOPSR regarding forestry and gamekeeping.	CZ	Yes	Wolf	40-50	2-10
Tourism	1	Beskydhost	An association of local tourism organisations including hotels, small businesses, and municipal funders; the recently aim to protect ecosystems by drawing tourists away from game trails and other sensitive areas.	CZ	Yes	Wolf	30-40	10-50

Most cooperative ties were organised around Cons. 2 and PLA 1. Most stakeholders had at least two cooperative ties with other stakeholders, four stakeholders had only one cooperative tie, and one stakeholder had zero ties to others: Farm 1 was contacted via referral, but only identified cooperative ties with new and highly localised stakeholders who were not part of the sample. The six Slovak stakeholders form an out-group connected to the Czech side exclusively through the cooperative ties of Cons. 4 and PLA 2. Cons. The only stakeholder operating in both countries is Cons. 2. Cons. 2 have more connections on the Czech side of the network, which is unsurprising given their local office is in Olomouc, CZ. Similarly to Czechia, the most central and connected stakeholder in the Slovak part of the network was the local PLA administration (PLA 2). The overall network density of cooperative ties was 19.4%. The part of network with the highest density was the network of stakeholders involved in wolf conservation only (52.7%). The density of the three Czech districts was 26%, while the density of the network in Čadca was 38%. This was unsurprising, given the close cooperation of stakeholders involved in wolf cooperation, and the consistency with which they referred to each other in the snowball sample.

Across the case study, there were three main purposes underlying stakeholder cooperation in relation to wolves: conservation and generating scientific knowledge, HWC mitigation, and limiting the wolf population. The purpose of cooperation in relation to boar meanwhile was the mitigation of damages and their hunting for sport.

Conserving wolves

Across the four districts in the case site, conservation NGOs (Cons. 1-3), both PLA administrations, and state government (Cons. 4) cooperated on cross-border GPS monitoring of the wolf population through radio collaring. This was combined with a wolf-tracking initiative run by Cons. 2 and using volunteers to provide population estimates and migration data, generating scientific knowledge intended to inform conservation efforts. In Czechia, Cons. 2 cooperated with the local govt. 1 to collect wolf DNA samples to be analysed by researchers at Mendel University, again for scientific knowledge and conservation. In Slovakia, a group of state (Cons. 4) and local authorities (Local govt. 3), PLA administrations (PLA 1 and 2), conservation NGOs (Cons. 2), and consultants (Consult. 1) are cooperating on the planning of an 'Ecoduct' to allow wildlife including wolves and boar to bypass a motorway and railway line outside the town of Svrčinovec, near the Czech border. This is to be completed in 2023 and is part of the wider TRANSGREEN initiative, an EU Interreg project which aims to contribute to safer and environmentally friendly road and rail networks in mountainous regions including the Carpathians (Immerová et al., 2019).

Mitigating human-wolf conflict

Related to conservation, some stakeholders cooperate on initiatives intended to reduce HWC by mitigating the human risks involved. Traditionally this has involved a compensation scheme for livestock killed by wolves. This scheme involves the cooperation of local administrations (Local govt. 1 and 2) and state government (Cons. 4), and sheep farmers (Farms 1, 2, and 3). The farmers must go through a rigid and often lengthy process to prove the loss of sheep to wolves, that requires signing off by a veterinarian. In the Czech districts, the district administration (Local govt. 1) then evaluates the application and approve or reject the compensation. There are calls (particularly from local govt. 2 and farm 2) for further development of recently installed subsidy schemes, which provide sheep farmers with additional financial resources to invest in protective measures such as electric fencing and traditional protection dogs. The subsidy schemes involve the cooperation of local administrations, the association of sheep and goat breeders (SCHOK) and the Czech private

farmers' trade union (ASZ) - both of which farm 2 is an important member of, conservationists, and the affected farmers themselves. Farmers often seek the assistance of consultants (Consult. 1 and 2) and conservation NGOs (particularly Cons. 1) to complete the application processes for compensation and subsidies. Both the compensation and subsidies are managed by different regional administrations and vary in their terms; in Čadca for example the compensation scheme is administered by PLA 2 and requires the recipient to have had adequate protective measures in place at the time of the attack to receive the compensation.

Perhaps in recognition of underlying social conflicts, some stakeholders cooperate on educational initiatives to reduce HWC with wolves. Cons. 1, Gamekeeper 2, and the Frýdek-Místek forestry association (who is not a sample stakeholder, but of which Gamekeeper 2 is a member) have organised workshops to educate local gamekeepers and foresters on the ecology and ecosystem benefits of wolves. Both PLA 1 and 2 produce educational materials for schools, exhibits, and regular publications to inform local people on the topic. PLA 1, Cons. 1, and Tourism 1 have cooperated on planning tourist hiking trails that avoid sensitive ecosystems and provide educational info points.

Limiting the wolf population

Other stakeholders cooperate in order to decrease the wolf population or limit their return to the area. Some gamekeepers (1 and 3), farmers (4), and members of local government (2) cooperate in publicly advocating against the protection of the wolf, or in favour of permissions to hunt the wolf. This cooperation involves spreading discourse with media including radio, television, and newspapers, or lobbying local government. A small number of actors are also involved in the illegal poaching of wolves in Czechia and Slovakia. It was not possible to identify specific stakeholders involved in this practice due to the possible repercussions, but they are likely to include a subset of gamekeepers and farmers who may cooperate to track and kill wolves, particularly individuals that are identified as 'problematic' for having killed livestock previously (Cons. 2, personal communication, February 1, 2022).

Mitigating boar damage

Wild boar in the case study area are known to cause damage to crops, fields, gardens, property such as fences, and sometimes forest plantations. The most straightforward solution to this problem is to hunt boar and reduce their population size, which is mostly performed through the cooperation of farmers and gamekeepers. Farmers (1, 3 and 4), foresters (1), or private property owners will alert gamekeepers (1, 2 and 3) to the presence of boar on their land, where the gamekeepers will try to shoot them. In Czechia, there was close cooperation where large farms (4) let gamekeepers (1) know in advance of their mowing the fields, making it easier for boar to be spotted and shot. Gamekeeper 1, a district hunting association, encourages local farmers to plant small plots in such a way as to draw in boar and make them easier to shoot.

The arrival of the African swine fever in Central Europe threatens the pork industry in Czechia and Slovakia, motivating both governments to increase the intensity of boar hunting through incentives and relaxed hunting regulations. In Czechia, hunting boar of any age and at any time of year is now permitted. Some gamekeepers (3) and foresters (1 and 2) are advocating for other means of reducing the boar population, such as through changes to agricultural and forestry land-use policies that would reduce the coverage of both crop- and forest-monocultures, which are seen as contributing to an overabundance of boar. Some gamekeepers (1) however see unkempt forest and the loss of the cultural landscape as contributing to the problem, as it reduces the efficacy of boar hunting.

Hunting boar for sport

Boar is a traditional game animal and is the most hunted ungulate in Czechia (Kamil et al., 2018), and likely in Slovakia too. Hunting is organised by individually run hunting grounds that provide licenses, and these hunting grounds are members of district hunting associations (Gamekeepers 1, 2 and 3). Hunting grounds, hunting associations, and the Czech and Slovak hunting chambers together cooperate on all aspects of boar hunting and agree on quotas and permissible methods with the respective ministries of agriculture each year. Boar provide a source of revenue for hunting grounds through sales of meat, and more recently through cash rewards from the state to encourage boar hunts. It is therefore in the interest of the hunting grounds to ensure that there is a certain population size of boar, leading to the practice of feeding boar over the winter. This strains the cooperative relationship with farmers (1, 2 and 3), foresters, and local government (3), as it is seen as contributing to increased boar damages.

4.1.2 Coalitions

The cluster analysis identified four coalitions in the cooperation network (Table 3). Each coalition had a higher average tie strength than the network average of 0.3, indicating stronger ties within coalitions than outside them. Nine stakeholders were not part of a coalition. Each coalition contained stakeholders of differing stakes. The four coalitions were named based on the main function of their cooperation.

Table 3 Coalitions.

Columns show coalitions of cooperating stakeholders identified by cluster analysis, the average strength of ties within the coalition, and the members. The coalitions are distinguished by colours corresponding to node colour in the coalition network graphs below.

<i>Coalition name</i>	Hunting coalition	Conservation coalition	Roznov coalition	Sheep farm coalition
<i>Tie strength</i>	1.5	2.1	3	3
<i>Coalition members</i>	Gamekeeper 1 Farm 4	PLA 1 PLA 2 Conservation 3 Conservation 2 Conservation 4	Forestry 2 Conservation 1	Farm 2 Local govt. 2

The *hunting coalition* was expected, due to the good cooperation of Gamekeeper 1 and Farm 4 and relatively little cooperation with the other stakeholders. This coalition cooperates mainly to facilitate boar-hunting and reduce damage to the latter's crops. They frequently echoed each other's arguments regarding both wolves and boar. These were the two stakeholders most strongly opposed to the return of the wolf to Czechia. Both see the legislation protecting wolves and other animals as going too far, and Gamekeeper 1 advocates for the loosening of restrictions on hunting wolves.

The *conservation coalition* is the largest coalition, and was expected to emerge from the cluster analysis, given the close cooperation of these five stakeholders. The two PLAs and three conservationist stakeholders work together on several wolf conservation initiatives, including the wolf-watch, radio-collaring, and sharing wolf population data. It was somewhat surprising that Cons. 1 was not part of this coalition due to being another conservation NGO, but it appears that it has diverged from the other conservation stakeholders in recent times by focussing more on supporting sheep farmers afflicted by wolf damage, rather than traditional wolf conservation.

Instead, Cons. 1 was part of an unexpected coalition with Forestry 2. There was not a clear functional basis for this coalition, and so it was named the *Roznov coalition* since both stakeholders are based close to each other in the city of Rožnov pod Radhoštěm in Vsetín District (CZ). They have cooperated in the past on the monitoring and collaring of large carnivores in LCR forestry lands, each rating the cooperation as good. It is possible that their close cooperation can be partly explained by the geographic proximity of their office (a five minute walk), which can be influential in the cooperation decisions of environmental NGO networks (Jasny et al., 2019). If it is the case that the Roznov coalition is based (partly) on geographic proximity rather than common beliefs, this might show in less alignment on beliefs in this coalition than the others. The *sheep farm coalition* consisting of Farm 2 and Local govt. 2 was expected due to the close cooperation of these stakeholders in advocacy for better supports (compensation and subsidies) for sheep farmers.

The conservation coalition includes all the ‘main players’ in wolf conservation in the study area. As expected, the greatest conservation conflict appears to occur between them and the hunting coalition, based on stakeholders’ reports. The hunting coalition is much smaller in comparison, despite farmers and gamekeepers being two of the largest groups of stakeholders. The risk of sampling error is reduced by similar numbers of conservationists (4), farmers (4), and gamekeepers (3) being surveyed. Additionally, many of the stakeholders listed under other stakes were also part-time gamekeepers (see Appendix 2). This may indicate that while cooperation in conserving the wolf is a regional-level activity at the case site, cooperating on hunting boar and opposing the return of the wolf occurs on a local level between small groups of stakeholders. Examining the bridging stakeholders in the network also helped to shed light on the nature of cooperation of these two coalitions.

Bridging stakeholders

The analysis of betweenness centrality confirmed that the stakeholders most central in the network graph (Figure 4) are also the most bridging stakeholders. Six were identified, five of whom are also members of the conservation and hunting coalitions (Table 4). The sixth (Local govt. 1) is not part of a coalition, but likely is a bridging stakeholder because of their central role in administering HWC compensation in Frýdek-Místek District, involving cooperation with farmers, conservationists, and officials.

Table 4 Bridging stakeholders.

Columns show stakeholders with the highest betweenness values, their coalition affiliation, and betweenness scores. Betweenness centrality is a measure of brokerage, and those with the highest scores are the stakeholders most frequently occurring on the path between any two other stakeholders.

Bridging stakeholders	Coalition	Betweenness (%)	nBetweenness (%)
Conservation 2	Conservation	66	31
PLA 1	Conservation	47	22
PLA 2	Conservation	42	20
Conservation 4	Conservation	28	13
Local govt. 1	NA	20	10
Gamekeeper 1	Hunting	19	9

The four most bridging stakeholders (Cons. 2, PLA 1, PLA 2 and Cons. 4) are all part of the conservation coalition, indicating that the coalition itself has a bridging role in the network. Indeed, the conservation coalition bridges other stakeholder groups with whom they cooperate on wolf conservation, including foresters, farmers, and gamekeepers (Figure 4). These four coalitions are the core elements of the cooperation network in wolf conservation and boar

management at the case site. They work closely together towards different functions, but function alone does not explain which stakeholders work with whom. Stakeholders are expected to need to first agree on certain principles in order to cooperate. Having shared beliefs regarding for instance the nature of the problem and therefore the ideal solutions is expected to explain why some stakeholders can cooperate with a coalition and others cannot. In the next section I explain the results of applying coalition members' beliefs to their networks, and whether beliefs are the factor driving coalition formation.

4.2 The influence of stakeholders' beliefs in cooperation

Six key themes were identified by the QCA within which stakeholders held varying beliefs (Table 5; for all beliefs see Appendix 5 Appendix 11). These included one theme in secondary aspects, three themes in policy core beliefs, and two themes in deep core beliefs. This section is structured to discuss each level of belief in that order and is illustrated with network graphs of the coalition members and their connections to specific beliefs. I found that each level of beliefs was consistent among the members of each coalition to some degree, and that policy core beliefs relating to problems and solutions in particular appear to be the uniting factor behind the coalitions.

Table 5 Stakeholders' beliefs.

The six themes identified in the QCA that were applied the coalitions, and their respective sub-categories of beliefs. The columns on the right show the number of stakeholders who referenced each belief, and the total number of times the belief was referenced by all 21 stakeholders.

Level of belief	Theme	Belief	Stakeholders	No. of references
Secondary aspects	Performance of specific programs and institutions	Bad subsidy structure	11	31
		Nonsense regulation	8	22
		Inaccurate wolf counts by hunters	3	4
		Friction with EU legislation	3	3
Policy core beliefs	What is the nature or cause of the problem?	Bad governance, cooperation, management of HWC	21	195
		Human activity	20	82
		Animals themselves	19	78
		Beliefs, attitudes, priorities	12	28
	What are the ideal solutions?	Conservation and environmental protection	18	45
		Mitigation by securing sheep	13	45
		Cooperation, engagement, compromise	13	41
		Preserve the cultural landscape	12	27
		Lethal control of wolves and boar	11	32
		Education	6	12
		Better governance	5	7
	Who should be involved in solutions?	Adaptation	4	5
		Land sparing, not sharing	3	3
Elected officials		7	8	
Key stakeholders		7	8	
Deep core beliefs	The ideal landscape	Locals or public	3	4
		Experts	3	3
	The nature of man	The cultural landscape	20	117
		A wilder landscape	13	36
	Mutualism	20	220	
	Domination	16	115	

4.2.1 Secondary aspects

The secondary aspect theme with the most references in interviews was the performance of specific programs and institutions in wolf conservation or boar management. Stakeholders went to lengths to explain the problems with these, and very rarely spoke positively about them. Stakeholders expressed negative views on a selection of programs and institutions, the most common being the compensation and subsidy schemes for wolf damage and wolf protections respectively; agricultural, land-use, and environmental regulations perceived as being nonsensical or incoherent; the Slovak system of wolf population measurement using gamekeepers' estimates being unreliable; and negative views of specifically EU legislation, particularly pertaining to agriculture and protected species. Across all stakeholders, conservationists and local administrations tended to express most negative views of the structure of compensation and subsidies, whereas farmers, gamekeepers, and some foresters tended to express negative views of agricultural and environmental regulations.

Two of the four coalitions agreed on the same secondary aspect, and two coalitions were divided (Appendix 12). The hunting coalition emphasised that agricultural and environmental regulations were too restrictive, were nonsensical, or had in some way gone too far. Conservationists tended to be happier with the current level of regulation, or thought more regulation was needed. The conservation coalition was divided between two beliefs, based on whether they were in Czechia or Slovakia. In Czechia, Cons. 2 and Cons. 3 emphasised that the system of supporting farmers to mitigate HWC through compensation and subsidies was insufficient and in need of greater resources and better management. In Slovakia, Cons. 4 and PLA 2 meanwhile complained about gamekeepers' estimates of wolf populations. Slovakian wolf conservation policy has been predicated on estimates of wolf numbers provided by individual hunting grounds; many Slovakian stakeholders complained about the unreliability of these numbers, with some suggesting they are exaggerated intentionally to increase the annual hunting quotas and thereby hunt more wolves.

The sheep farm coalition was divided, with Farm 2 agreeing with the hunting coalition on the issues with nonsense regulation, complaining about restrictions on sheep grazing imposed on farmers by EU legislation. Local govt. 2 meanwhile, a town mayor, is directing his focus to achieving an improved system of compensating sheep farmers for wolf damage and subsidising the costs of protective measures (to which he turned to Farm 2 for expert opinion). Members of all coalitions but the hunting coalition strongly expressed views about the inadequacy of the compensation and subsidy system.

4.2.2 Policy core beliefs

The policy core themes with the most references were the nature or cause(s) of the problem; the ideal solutions; and who should be involved in implementing those solutions. Across each of the 3 levels of beliefs, most beliefs were identified in relation to stakeholders' understanding or framing of the problem(s) in wolf conservation and boar management, and often following from that, their proposed or preferred solutions. It was not surprising that these themes were populated with the most references, as it was expected that participants would tend to spend more time talking about problems and solutions than history for example. Based on the theoretical framework, I expected to see increased agreement of coalitions on policy core beliefs when compared to their agreement on secondary aspects (above).

The nature or cause(s) of the problem

After the first round of interviews, the pattern emerged of a divide between stakeholders who framed the problem(s) related to wolves and boar as being caused by the animals themselves,

or by humans and their activities. Additionally, almost all stakeholders at some point in their interview framed the problem(s) as being issues of bad governance, cooperation, or management (21); caused by human activities (20); or caused by the wolves or wild boar themselves (19). Of these, governance, cooperation, and management were referenced by far the most. Unexpectedly, 12 of the 21 stakeholders also referenced others' beliefs, attitudes, and priorities as causes of the problem(s). Stakeholders therefore for the most part saw the issue as complex and multi-factorial.

The coalitions are mostly aligned on their most prominent beliefs regarding problem framings (Figure 5). It was expected that conservationists would tend to cite human activities as the problem behind HWC, and for hunters and perhaps farmers to cite the animals themselves and their activities as the problem. Indeed, the hunting coalition did blame animal activity. They tended to frame the issues of wolf conservation and boar management in terms of the return of the wolf to Czechia, its growing population in Slovakia, or the growing population of boar in either country. They commonly argued that some element of either animal's behaviour was unnatural or pathological (*patologický*) and was thus causing HWC.

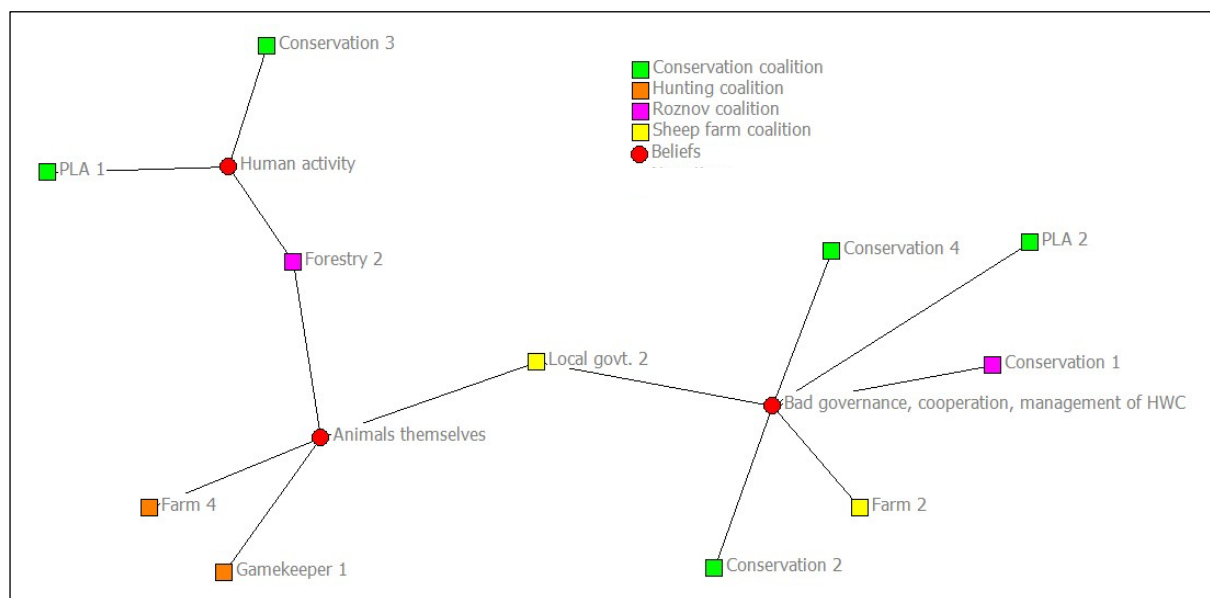


Figure 5 Coalitions and beliefs regarding the nature of the problem.

Coalitions can be identified by the colour of stakeholder-nodes, and ties represent stakeholders' held beliefs.

The conservation coalition is unexpectedly divided between the problem framings of 1) bad governance etc., and 2) human activity. Cons. 3 and PLA. 1 from the conservation coalition blamed human activity as expected. They implicated overdevelopment and fragmentation of the landscape, large numbers of tourists, over-hunting and poaching, and farmers' failure to mitigate damage incurred by wildlife. However, the rest of the conservation coalition along with the sheep farm coalition instead blamed bad governance etc. Common criticisms levelled at conservationists by other stakeholders included that some were 'extremists' or uncompromising idealists. It is possible then that this tendency to implicate governance etc. may represent an effort to moderate views in response to such criticisms.

It is notable that the sheep farm coalition agrees with these conservationists, as well as Cons. 1 from the Roznov coalition; these were the stakeholders most focussed on mitigating HWC through support for affected sheep farmers. The Roznov coalition is not in agreement on the problem framing, which is expected to be a fundamental policy core difference. Local govt. 2

expressed equally prominently the beliefs in animals themselves and bad governance etc., and therefore links the two groups. This was not a surprise as Local govt. 2 had a clear disdain for wolves and was accused by another stakeholder of actively spreading fear of them in the municipality. Farm 2 had a very balanced view in general, and only blamed cooperation. In the interviews, the same stakeholders that here are linked to bad governance etc. tended to have the most balanced perspectives, in that they more often referred to different perspectives on certain issues where other stakeholders only referred to one perspective. It was unsurprising that both Slovak members of the conservation coalition were linked to bad governance etc. A theme emerged from the interviews of Slovak stakeholders complaining that governance and particularly conservation experienced significant problems of resources, management, and attitudes, especially when comparisons were made to Czechia.

The ideal solution(s)

There were a great variety of solutions proposed to the problems related to wolf conservation and boar management. The most popular solutions included conservation, mitigation, and lethal control. A clear distinction formed in the solutions related to wolves: conservation and hunting. Stakeholders favouring conservation-based solutions sought to reduce or prevent any hunting of the wolf, tighten development regulations, or improve education. Those believing in hunting-based solutions favoured lethal control of problem animals, designated areas for wildlife outside of which they could culled, or the reinstatement of seasonal hunting periods for the wolf. There was little variation on solutions related to boar however, since the problem was for the most part accepted to be the population size, and the solution that followed was the lethal control of the population.

The diversity of solutions fragmented each coalition except the hunting coalition (Appendix 13). The hunting coalition were agreed on the lethal control of wolves and boar as their preferred solutions to HWC in each case. The different solutions were not mutually exclusive however, and some had logical overlaps. The conservation coalition's solutions followed from their problem framings: Cons. 2 and Cons. 3 believed in mitigating wolf damages by securing sheep; while Cons. 4 in Slovakia believed in improving cooperation, engagement, and compromise.

Graphing the combined policy core beliefs of problem framings and preferred solutions restores the coalitions (Figure 6). The hunting coalition understand animals to be the problem, and logically prefer the solution of lethal control. The conservation coalition is aligned on a spectrum of related problem framings and solutions, which range from: 1) the problem is human activities, and the solution is conservation and environmental protection (PLA 1), to 2) the problem is one of bad governance etc., and the solution is better cooperation (Cons. 4). The Roznov coalition meanwhile do not share problem understandings, nor preferred solutions, which is expected if their cooperation is indeed based on their geographic proximity rather than shared policy core beliefs. The network of both problems and solutions was highly connected, suggesting that although the coalitions have differing beliefs, the cooperation network is such that there are linking beliefs (bad governance etc., mitigation by securing sheep) and bridging stakeholders (e.g., Local govt. 2 and Forestry 2) that could provide common ground and opportunities for novel cooperation.

Farm 2 and Local govt. 2 (sheep farm coalition) each see bad governance etc. as a problem, which follows from their complaints about regulations and the system of compensation and subsidies (secondary aspects). Local govt. 2 also believes the animals themselves are a cause,

which explains his divergence from Farm 2 in preferred solutions: Farm 2 is seeking mitigation by securing sheep, whereas Local govt. 2 wishes to preserve the cultural landscape.

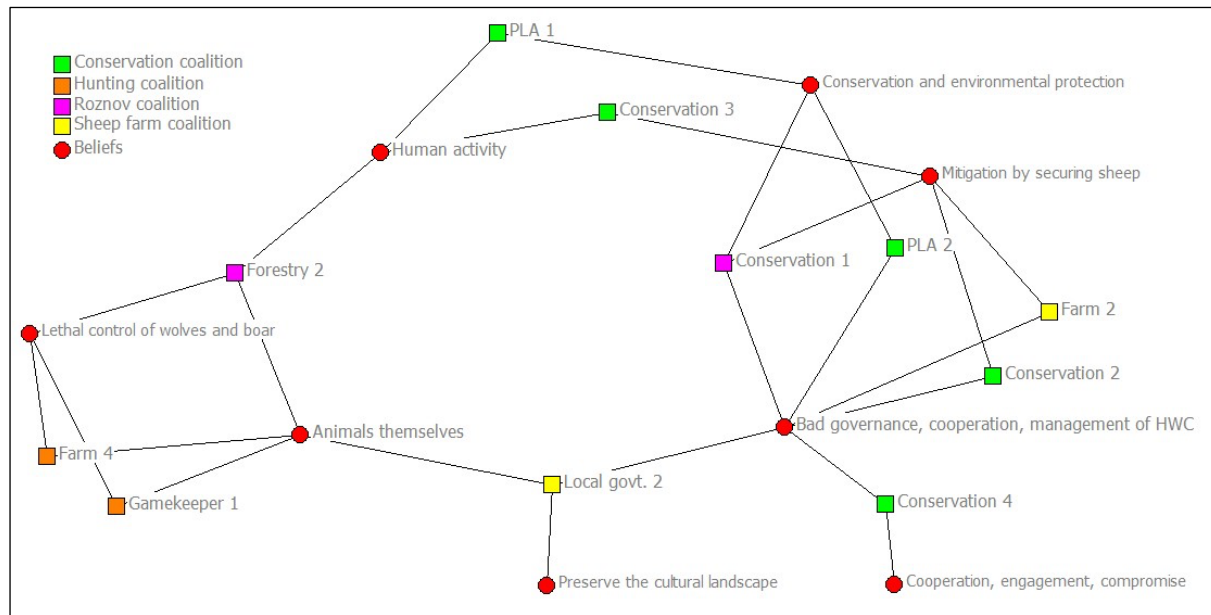


Figure 6 Coalitions and beliefs regarding problems and solutions.

Who should be involved in implementing solutions?

Related to preferred solution, stakeholders could be differentiated based on their policy core belief regarding who ought to be involved in implementing these solutions. The most common beliefs were in elected officials and ‘key stakeholders’, the latter including each of the main stakeholder groups identified in the case study. Some believed that only ‘locals’ should be involved, rather than for example outside experts or government; while others believed only qualified experts such as conservation scientists or foresters should be involved.

The coalitions were again aligned on these policy core beliefs. The hunting coalition were alone in believing that it ought to be locals who were involved in implementing their preferred solution, which is logical given they favoured lethal control for both wolves and boar. This solution is already in place for boar, managed by the hunting coalition and similar stakeholders elsewhere. They would like to see the same for wolves, and that it be managed again by a coalition of local gamekeepers and farmers. The three members of the conservation coalition that expressed a belief under this theme believed in the implementation of solutions by elected officials (PLA 1 and Cons. 3) and by key stakeholders (Cons. 3 and Cons. 2). This made sense given their general support for environmental regulations and for their focus on improving cooperation and governance as a solution to HWC. The sheep farm coalition was split between elected officials (Farm 2) and key stakeholders (Local govt. 2). Farm 2s belief was notable considering their issues with environmental and agricultural regulations, whereas in the case of Local govt. 2 their belief was expected due to their emphasis on cooperating to support sheep farmers. Forestry 2 of the Roznov coalition believed in the involvement of key stakeholders and experts, while Cons. 1 expressed no specific belief.

4.2.3 Deep core beliefs

The deep core belief themes with the most references were the nature of man and the ideal landscape. The nature of man refers to the stakeholders’ understanding of their place in nature and relationship to animals and ecosystems: either being part of nature (mutualism); or having dominion over nature (domination) (Manfredo, Teel, Carlos, et al., 2020; Sabatier, 1988, 1998).

The ideal landscape was an emergent theme during the interviews, distinguishing between responses with differing understandings of how the local landscape ought to be.

The nature of man

As expected, domination beliefs were common among gamekeepers, farmers, and foresters, all of whom have roles that can imply a domination relationship with nature. Mutualist beliefs meanwhile were common among conservationists, whose work to conserve or protect wildlife can imply an underlying intrinsic valuation of wildlife and a positioning of the self within (rather than separate to) nature (Dietsch et al., 2016). It was unexpected however that more stakeholders referenced mutualist deep core beliefs than domination beliefs. Domination beliefs are often associated with rural pastoral landscapes, where human activities are centred on farmer-livestock relationships, and animals are managed and used for human benefit (Manfredo, Teel, Don Carlos, et al., 2020). However, the two beliefs were not mutually exclusive in terms of all references: Most stakeholders referenced either belief at least once per interview. It was therefore particularly informative in this case to analyse the most prominent beliefs among coalition members (Figure 7).

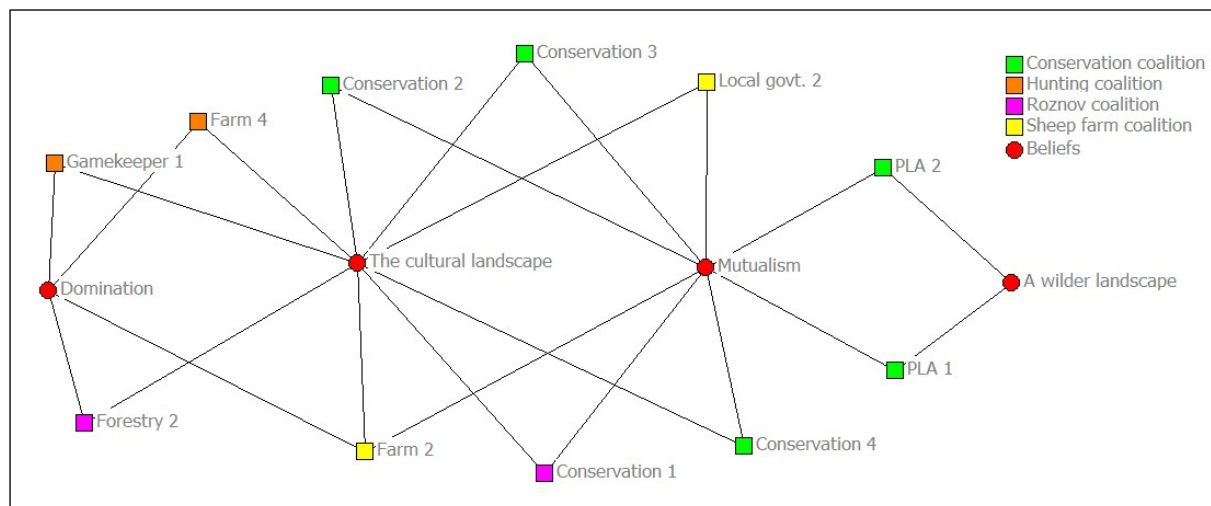


Figure 7 Coalitions and deep core beliefs.

The coalitions were consistent in their most prominent beliefs regarding the nature of man. As expected, the hunting coalition held domination beliefs, while the conservation coalition held mutualist beliefs. Both sheep farm coalition members were linked to mutualism, but one, Farm 2, was also linked to domination (having an equal number of references to each belief). The Roznov coalition meanwhile was split, with Forestry 2 having domination beliefs and Cons. 1 having mutualist beliefs. The former was unsurprising, since forestry involves a degree of commodifying nature, and the interviewed representative was also a gamekeeper part-time.

The ideal landscape

Many responses from stakeholders revolved around the theme of how the local landscape ought to be or appear, though the word ‘landscape’ was infrequently used by the interviewees. These references to the landscape were sometimes explicit references to the need to protect or ‘return to’ a particular past state of the landscape but were also implicit in stakeholders’ discussions of the problems and solutions facing the area. I inferred that this was a deep core belief because 1) similarly to the nature of man, there were some explicit references to this belief, but mostly implicit references, suggesting this was a fundamental axiom (Sabatier, 1998); 2) the responses appeared to relate to stakeholders’ relative priority of ultimate values, which are another

illustrative component of deep core beliefs (Sabatier, 1998). I observed that there appeared to be two broad groups in these responses: 1) those reflecting a belief in the traditional cultural landscape of sheep pastures and meadows; and 2) those reflecting a belief in a ‘wilder’ landscape, with less human developments and infrastructure, and more space for wildlife.

The coalitions were somewhat aligned on their beliefs in the ideal landscape. All coalition members believed in the cultural landscape rather than a wilder landscape, except for PLA 1 and PLA 2. The PLAs both expressed strong wishes to reduce human development in their areas, increase the populations of native species, and in the case of PLA 1, to upgrade Beskydy PLA to national park status. PLA 1 strongly supported the comeback of the wolf and linked it to their main aim, stating “The wolf should be a part of nature as it was in the past. We would like to have as many wolves here as can the land can feed” (PLA 1, personal communication, February 3, 2022). This is in contrast to other members of the conservation coalition, that were careful to emphasise the importance of promoting the coexistence of humans and wolves.

In brief, while deep core beliefs and secondary aspects are somewhat aligned among the coalitions, policy core beliefs are very consistent with the coalitions. This result was expected based on the theoretical framework: secondary aspects and deep core beliefs often vary within coalitions, but policy core beliefs, especially those relating to problems and solutions, tend to be uniform within coalitions and distinct between them (Sabatier, 1988, 1998). Stakeholders’ beliefs therefore have a clear influence in their decisions regarding cooperation the conservation and management of wolves and boar. It remains to be seen how these beliefs develop, and whether they are informed by the local historical context. In the next section I describe the results of the analysis of historical narratives and their relationships to beliefs and coalitions.

4.3 The influence of stakeholders’ historical narratives in cooperation

A variety of narratives explaining the influence of the past on the present were identified by the QCA (Appendix 14). Of these, nine were referenced by at least two stakeholders and at least one member of a coalition (Table 6). This section describes these nine narratives and examines their relationship to the coalitions and beliefs, illustrated with network graphs. I found that narratives were as often shared between coalitions as within them, and that stakeholders tended to have thematically similar narratives and beliefs, but there was otherwise little alignment of narratives and beliefs or coalitions.

Table 6 Stakeholders’ historical narratives.

The narratives represent stakeholders’ understandings of the influence of historical developments on the present conservation and management of wolves and boar. The columns on the right show the number of stakeholders who referenced each narrative, and the total number of times the narratives was referenced by 21 stakeholders.

Narrative	Stakeholders	No. of references
The landscape, especially forest cover	12	15
Environmental and hunting regulation	9	16
Attitudes to conservation and management	9	15
Land use, especially increased development	9	13
Animal populations	9	13
Legacy of the fall of Communism	7	12
Government institutions	6	11
Improving cooperation	5	6
Declining gamekeepers	2	4

No one narrative was dominant among the stakeholders, although some were more common than others. It was expected that influential developments would include changes in land cover and land-use; the transition from socialism to capitalism and related socioeconomic and institutional changes; and changes in the distributions of wolves and boar. The narrative of the changing landscape driving change in conservation and management was the most common. Stakeholders placed particular emphasis on changing forest cover (afforestation in most cases, deforestation in others), which they understood to have driven the changes seen in populations of wolves and boar at the case site. A related narrative was that of developments in land-use, and particularly increasing development (including residential, transport, and tourism-related development). Both narratives focus on changes in the landscape as the key development, but are distinguished by their causative understandings: 1) ecological changes in the landscape, and 2) changes in human activity in the landscape.

The fall of communism in the former Czechoslovakia (1989) was hypothesised to be an example of an external perturbation likely to have a discernible influence on stakeholder beliefs and cooperation. It emerged however that most stakeholders did not perceive the event to have impacted on the system of conservation and management, with only seven stakeholders referencing the fall of Communism and transition to market capitalism as influential developments. Amongst these responses, most emphasis was placed on the process of restitution, and particularly the restoration of pre-socialist land tenure in the Čadca district. No stakeholder mentioned the emergence of the environmental movement in the wake of the Revolution as an important development (Konvička and Kavan, 1994). However, developments in environmental and hunting regulations, and changing government institutions were both seen as influential developments, particularly by conservationists and in relation to the wolf (Chapron et al., 2014). Several stakeholders explained that little had been changed in boar management by the Revolution, since the primary management regime – the gamekeepers – remained a constant despite the institutional changes.

4.3.1 Narratives and coalitions

I expected that narratives would be consistent within coalitions and differ between them, similarly to beliefs. Instead, stakeholders' most prominent narratives were inconsistent with their coalitions and were more often shared between coalitions than within them (Figure 8). Only the narrative of environmental and hunting regulation was consistent between two members of a coalition: PLA 2 and Cons. 4 (conservation coalition). These are the two Slovak members of the coalition, who spoke at length about the problems with Slovak environmental governance, and therefore may be expected to perceive historical developments through the lens of relevant regulation. Five coalition members had more than one prominent narrative (with equal references), which contributes to the connectivity of the network. A large sub-group containing most of the conservation coalition and the Roznov coalition expressed a range of narratives centred on developments in the landscape, regulation, institutions, and cooperation. There are also two smaller sub-groups. Farm 4 and Local govt. 2 are linked to narratives focussing on changing animal populations, and the decline of the gamekeepers that manage them. This reflects the belief that it was changes in wolf and boar distribution driving change in conservation and management, rather than other underlying factors. They explained that gamekeepers are an ageing population, and that there is little interest in gamekeeping among young people. The remaining sub-group consists of Cons. 2, whose most prominent narrative was of evolving attitudes to wildlife conservation and management. Cons. 2 has published research on shifts in public perception and media content responding to the return of

wolves to the case site, and sees stakeholders' attitudes towards the animals as critical in reducing HWC (Kutal et al., 2018, p. 182).

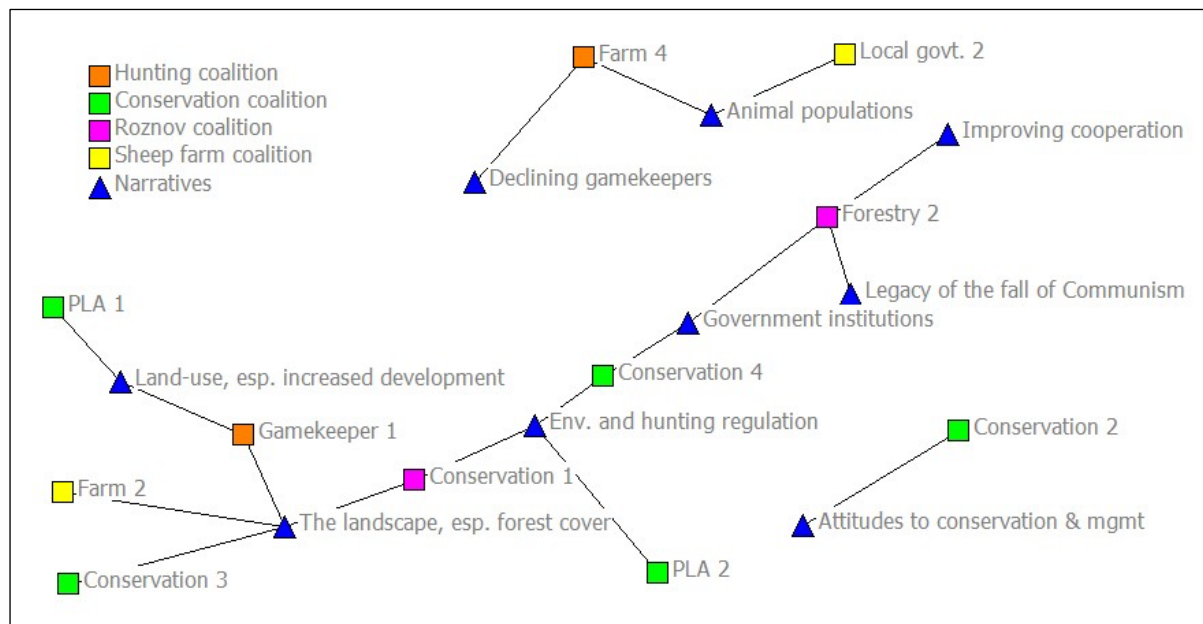


Figure 8 Coalitions and narratives.

The historical narratives were not consistent within coalitions, but frequently bridged coalitions. These results do not offer a clear relationship between the narratives and cooperation and leave open the possibility that narratives exist independently of coalitions or cooperation and do not factor into stakeholders' decisions in that regard. Since this analysis was inconclusive, I next investigated the relationship between historical narratives and the coalition-belief networks described in section 4.2, since beliefs are an influential factor in stakeholder cooperation behaviour.

4.3.2 Relating beliefs and narratives

The nine historical narratives were compared to coalitions' beliefs using network graphs. This was done for each level of beliefs. I found that: 1) Narratives contributed to slightly increased consistency of coalitions on secondary aspects; 2) Narratives slightly decreased the consistency of coalitions on deep core beliefs, due to bridging different coalitions; and 3) Narratives had little effect on the distribution of coalitions and policy core beliefs, instead bridging coalitions otherwise separated by their understandings of problems and solutions. Despite this, thematically similar beliefs and narratives were positioned together, indicative of shared elements of problem framings and narratives. It also emerged that the narrative of the changing landscape was the most central, and that stakeholders appear to converge on this narrative as the clearest means by which history influences the present.

Narratives and secondary aspects

Secondary aspects are not an important factor in coalition formation but may instead be more related to the shared experiences of stakeholders. The network of secondary aspects (Appendix 12) is fragmented, but including the narratives increased the network connectivity, and restores some consistency of coalitions and beliefs (Figure 9). The sheep farm coalition are more closely connected, as are the conservation coalition. However, I expect more consistency among the coalitions with the addition of policy core beliefs.

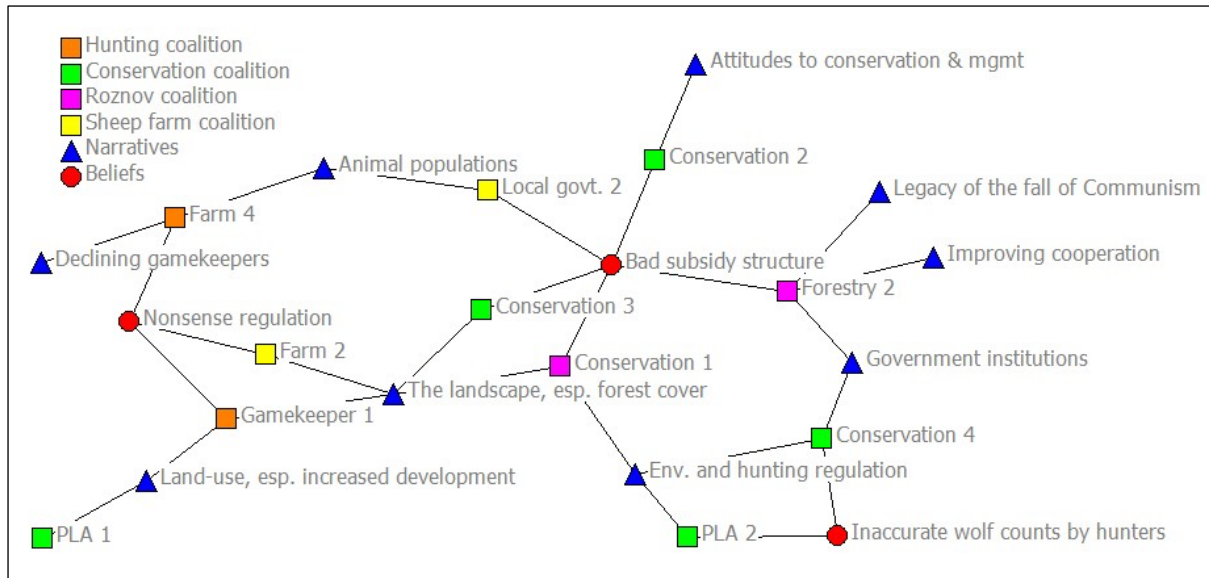


Figure 9 Coalitions, narratives, and secondary aspects.

Narratives and policy core beliefs

The coalitions in the networks of policy core beliefs and narratives (Figure 10, Figure 11) show a similar level of connectivity and fragmentation to the networks of policy core beliefs (Figure 5, Figure 6). The hunting and sheep farm coalitions are again consistent in their beliefs regarding problems and solutions. The Roznov and conservation coalitions meanwhile remain fragmented. The addition of the narratives did not alter the consistency of the coalitions in terms of spatial positioning.

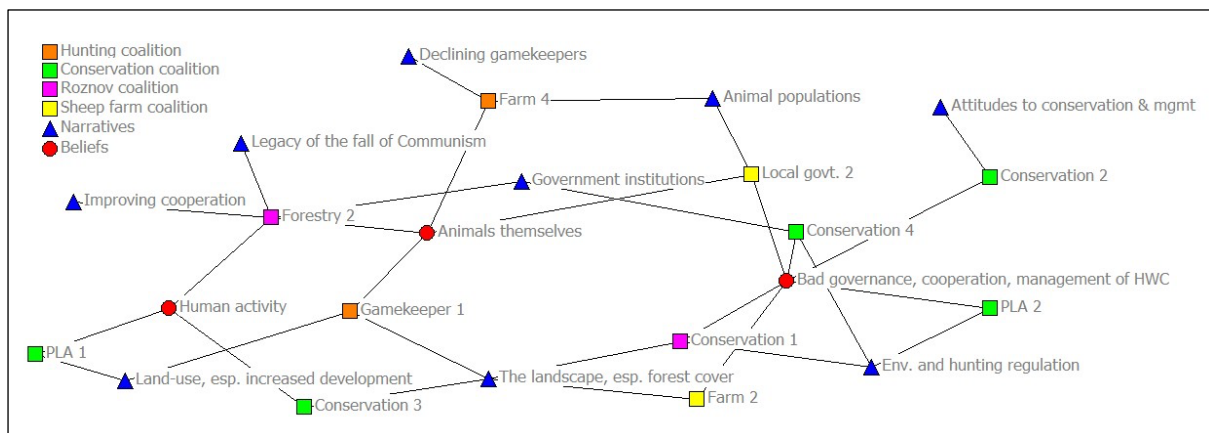


Figure 10 Coalitions, narratives, and the nature of the problem.

While policy core beliefs bind coalitions together, narratives tend to connect stakeholders from different coalitions. Certain narratives are more central while others are more peripheral. The most central are the changing landscape (connects all four coalitions), changing environmental and hunting regulation (two coalitions), changing institutions (two coalitions), changing animal populations (two coalitions), and changing land-use (two coalitions). These narratives may then provide opportunities for finding common ground among coalitions in spite of opposing beliefs. Spring embedding separates out stakeholders into most similar groups. When narratives are graphed with policy core beliefs, the conservation and sheep farm coalitions become closer to each other, while the hunting coalition remains separated. It appears that while the sheep farm coalition shares more narratives with the hunting coalition than it does

with the conservation coalition, they share more policy core beliefs with the conservation coalition than the hunting coalition.

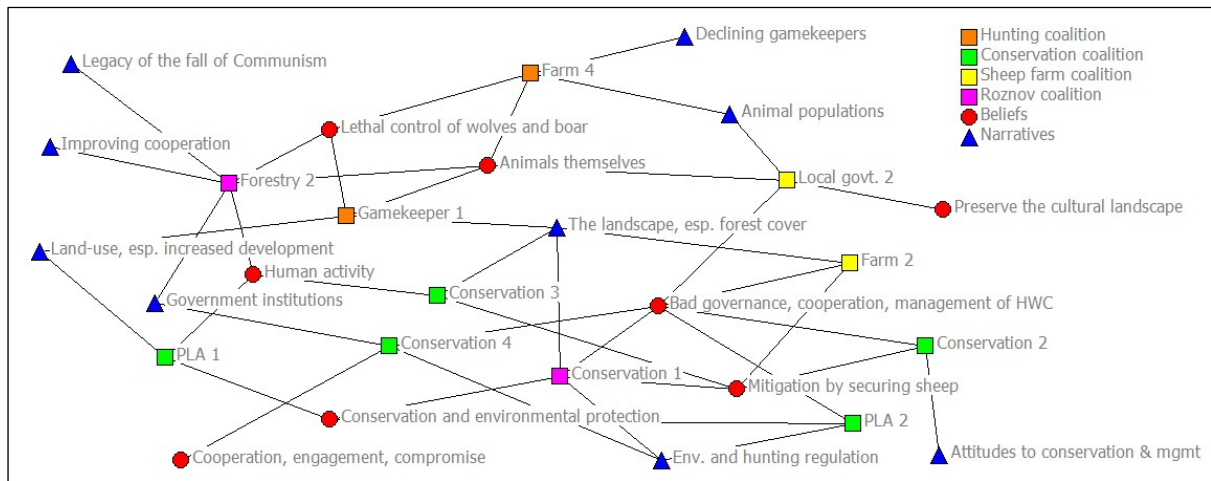


Figure 11 Coalitions, narratives, and the ideal solutions.

Narratives are spatially positioned in the networks close to policy core beliefs with similar themes, and particularly beliefs about the nature or cause(s) of the problem. The hunting coalition believes that wolves and boar are the cause of the problem. It is logical therefore that their narratives refer to changes in land-use, wolf and boar populations, and declining gamekeepers as the most influential historical developments in conservation and management. The sheep farm coalition also shares the narrative of changing wolf and boar populations, with the narrative of the changing landscape. However, they believe that bad governance, cooperation and management of HWC are the cause of the problem. Cons. 2, Cons. 4, and PLA2 (conservation coalition) share this policy core belief, but reference the narratives of developments in environmental and hunting regulation, institutions, and local attitudes. The Roznov coalition did not agree on the nature of the problem, nor on historical developments.

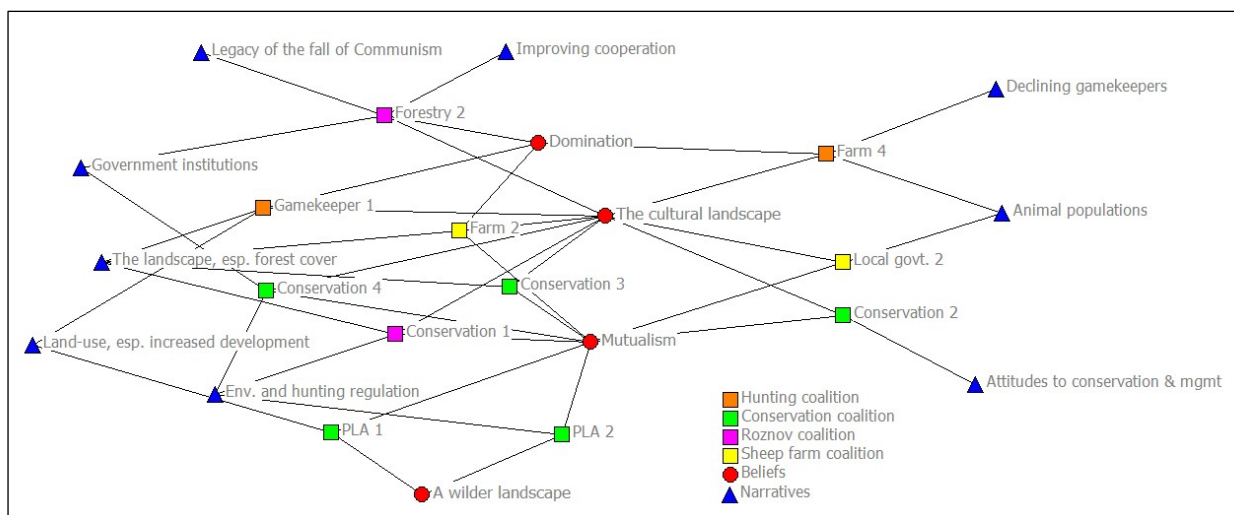


Figure 12 Coalitions, narratives, and deep core beliefs.

Narratives and deep core beliefs

The network of deep core beliefs and narratives (Figure 12) is more fragmented with less spatially distinct coalitions than the network of deep core beliefs only (Figure 7). This is a result of the narratives bridging the coalitions rather than gluing them together. The hunting coalition and sheep farm coalitions share deep core beliefs but not narratives, which separates their

members in the network. The conservation coalition share a set of deep core beliefs, and narratives that focus on institutions and landscape changes, apart from Cons. 2 who is isolated by their narrative of changing attitudes.

4.4 Summary of the results

A stakeholder network was identified containing four coalitions with varying functions. Bridging stakeholders were also identified, most of whom were part of the conservation coalition, which was also the coalition with the most members. Different themes of beliefs and narratives were extracted and varied among stakeholders and coalitions. The different levels of beliefs had varying relationships to the coalitions. *Secondary aspects* were not influential in coalition formation, but more likely represent the specific (un)shared experiences of coalition members. Members of the conservation and sheep farming coalitions were divided, though in the case of the former this was based on specific Czech and Slovak contexts, and in the case of the latter the beliefs were not mutually exclusive and based on each stakeholders' particular grievances. The coalitions were for the most part consistent in the *deep core beliefs* that were identified, though this is not understood to be a requirement for coalition formation (Sabatier, 1998; Sabatier and Weible, 2007). Rather, an unexpected majority of coalition members held mutualist beliefs regarding the nature of man and believed in the preservation of the cultural landscape. The latter in particular spanned coalitions and could provide common ground for cooperation between coalitions. *Policy core beliefs* were very consistent among the coalitions, as was expected. Beliefs related to understanding the problems of wolf conservation and boar management divided the conservation coalition. When problems and preferred solutions were looked at together, the conservation coalition became more consistent and distinct from the other coalitions. The hunting coalition remained particularly consistent in each theme of beliefs. Together these results are consistent with the supposition that policy core beliefs are the glue that binds coalitions together (Sabatier and Weible, 2007), and are therefore influential in promoting cooperation at the case site. The Roznov coalition however did not share policy core beliefs and was suggested to be based on geographic proximity instead.

Stakeholders' beliefs influence in their decisions regarding cooperation the conservation and management of wolves and boar. *Historical narratives* on the other hand were not consistent with the coalitions. Instead, narratives increased the overall network connectivity by bridging coalitions otherwise isolated by differing beliefs. Their relationship to cooperation was therefore inconclusive. Narratives had slightly different effects on different levels of beliefs, but the overall relationship between beliefs and narratives was also inconclusive. Thematically similar narratives and policy core beliefs were often spatially close in the networks, possibly reflecting shared elements or overlap in the two. It emerged that the narrative of the changing landscape was the most central, and that stakeholders appear to converge on this narrative as the clearest means by which history influences the present. This narratives is reflected in the most central deep core belief of the rightful cultural landscape.

5 Discussion

In this section I use the results to the answer research questions, before discussing: the implications of the research for the theoretical framework, the case site, and the wider issue of conservation conflicts; the limitations of the research; and future research directions.

SQ1. Who are the stakeholders in conservation and management and what cooperation networks and coalitions can be identified?

The conservation and management of wolves and boar at the case site affected and was affected by a diverse set of stakeholders, including organisations and individuals, who varied in type, function, and interest. They cooperated on conserving wolves, mitigating human-wolf conflict, limiting the wolf population, mitigating boar damage, and hunting boar for sport. The first hypothesis (H1) was confirmed, as four coalitions of preferentially cooperating stakeholders were identified: three cooperated towards a specific function, and one cooperated based on geographic proximity.

SQ2. How do beliefs influence coalition-formation and cooperation networks?

Stakeholders held a variety of beliefs along certain themes, at the level of secondary aspects, policy core beliefs, and deep core beliefs. The second hypothesis (H2) was confirmed, as the three function-oriented coalitions formed around and were held together by shared policy core beliefs. These consisted primarily of beliefs regarding the nature of the problem and preferred solutions. Policy core beliefs differed between coalitions. Secondary aspects and deep core beliefs were not important in coalition formation, but both provided connections between coalitions, and thereby increased the connectivity of the overall network of stakeholders and beliefs.

SQ3. How do stakeholders' historical narratives relate to beliefs and coalitions?

The third hypothesis (H3) was correct insofar as stakeholders were distinguished based on their differing narratives of the past but was finally rejected since 1) stakeholders who shared historical narratives did *not* share core beliefs, and 2) coalitions did *not* share historical narratives. The relationship of historical narratives to beliefs and coalitions was therefore inconclusive. Stakeholders held thematically similar narratives and policy core beliefs, which may reflect common elements of causation in them. Narratives were as often shared between coalitions as within them, suggesting a means of bridging the gaps in cooperation created by differing policy core beliefs.

The inconclusive results for SQ3 rule out the possibility of fully answering the main research question: '*How does local history influence stakeholder cooperation in the conservation and management of wolves and wild boar in the Western Carpathians?*'. The research failed to identify how the case site's historical context influences cooperation, but this does not preclude other causal relationships linking these variables. Alternative explanations and the wider theoretical implications of these results are discussed in the next section.

5.1 Theoretical implications

The historical context remains likely to influence cooperation, but not through the combined mechanism of narratives and beliefs, as was hypothesised. In the process, the research did confirm the influence of another social factor, beliefs, on cooperation in conservation and management. The results show that stakeholders' beliefs influence cooperation by gluing coalitions together, and they also demonstrate the suitability of the ACF for understanding conservation conflicts.

Historical context and narratives

The results of the analysis of historical developments were inconclusive, but the case study was intended to be exploratory, and still produced notable results. There are three main explanations for this finding: 1) there is no causal relationship between historical context and conservation cooperation; 2) there is a relationship, but there was a methodological error in measuring narratives and relating them to beliefs and/or coalitions, or 3) stakeholders' narratives are not a suitable operationalisation of the concept of historical context.

The first explanation ('no relationship') is the least likely. Historical developments and processes such as modernisation filter down into individuals' internalised systems of beliefs, values, and attitudes through their lived experiences (Manfredo, Teel, Don Carlos, et al., 2020). These are the systems that for the most part decide individuals' choices, for example in regard to conservation behaviours (Kaiser et al., 2005; Lynne et al., 1988; Weible, 2007). Individual level changes in internalised systems have emergent effects in the aggregate, influencing the meso level where coalitions are found, and sometimes the macro level of the socio-cultural system (Manfredo, Teel, Don Carlos, et al., 2020). It is therefore more likely that the influence of historical context on cooperation is difficult to measure rather than non-existent. Stakeholders agreed that their local history was influential in conservation and management, and explained a variety of mechanisms including landscape developments, institutional developments, and also improving cooperation and changing attitudes among the local population. Based on these mechanisms, future research could use 1) temporal variation in land cover data; 2) a historical institutional analysis using policy documents (if available); and 3) a longitudinal analysis of stakeholders attitudes, beliefs, or values (e.g., Kutal et al., 2018).

The narratives concept was not fully operationalised, to allow for an exploration of its relationship to beliefs and coalitions. This involved a trade-off in the ease of developing a reliable set of narratives. The narratives could not be defined in the same way as beliefs (top-down and bottom-up), along themes with alternate responses. Narratives were derived instead from the bottom-up without a guide. Alternative sets of narratives could have been arrived at through a different QCA process, which may have had different relationships to policy core beliefs and therefore to coalitions and cooperation. I tested this using three alternative narrative themes common among responses: institutional developments, landscape developments, and attitudinal developments. When these narratives were related to the coalitions, each coalitions but the conservation coalition were consistent in their narratives (Appendix 15). The results are only slightly different, but suggest that future research into this relationship should define a set of historical narrative themes, in response to which stakeholders hold various defined and discrete narratives explaining the influence of the past on the present. The narrative policy framework (NPF) for example seeks to operationalise policy narratives in a similar manner to the ACF, and breaks narratives down into the constitutive parts of setting, plot, characters, and the desired policy outcome (Shanahan et al., 2011, 2013). These components could be used to operationalise an analysis of stakeholder narratives in relation to a specific policy problem, and combined with a similar analysis of beliefs as I have done, to understand cooperation and conflict.

If the results of that research were similarly inconclusive, then that would leave the third explanation (conceptual error) as the most likely. I made the assumption that narratives would provide a window into the process of the local historical context filtering into stakeholders' internalised systems of beliefs, values, and attitudes, which then shape their behaviour. This was based on the concept of narratives as a core understanding formed by experience

(Dahlstrom, 2010). However, narratives can also be conceived of as constructs that stakeholders consciously or unconsciously develop to harmonise their goals with their core beliefs (Shanahan et al., 2011). In that case, narratives are an ‘output’ of the belief system rather than a factor influencing it, and cannot be used to identify the relationship between the historical context and beliefs or cooperation. This may explain why the case narratives were thematically aligned with policy core beliefs, yet were not shared within coalitions. The ideal means of identifying the relationship between historical context and cooperation and conservation conflict would therefore again be a longitudinal analysis of stakeholders attitudes, beliefs, and values, relating them to developments such as landscape and institutional changes.

Beliefs and cooperation in conservation conflicts

The research employed the ACF in the novel context of conservation conflict. Its suitability as a methodology for analysing cooperation as the dependent variable was demonstrated by correctly predicting the existence of cooperative coalitions held together by policy core beliefs. While the inclusion of deep core beliefs did not influence the coalitions, the findings can also contribute to the conservation conflict literature. The finding that most stakeholders held mutualist deep core beliefs fits with the trend of shifting values from domination to mutualism in North America and Europe (Manfredo et al., 2016; Manfredo, Teel, Don Carlos, et al., 2020). This value shift could have various implications for conservation conflicts, not least of which the social acceptability of wildlife management practices (Manfredo, Teel, Don Carlos, et al., 2020).

The ACF has previously been used in the socio-ecological context and in combination with SNA and stakeholder analyses (Lipsky and Ryan, 2011; Weible, 2007). This combination of theory and practical methods could provide more insights into the social phenomena underlying conservation conflicts. In particular, policy core beliefs are a key explanatory variable linking individual perspectives to group-level interactions. I found them to be accessible for measurement, since they were centred on problems and solutions which stakeholders had little difficulty discussing. This has the additional benefit that an analysis of stakeholders’ policy core beliefs lends itself to the discussion of solutions, alternatives, compromises, and areas of agreement between conflicting parties. Recommendations can therefore be made on to improve the management of conservation conflicts, with benefits therefore for mitigating HWC. The scope of these recommendations depends on the research design. In this case for example, the results have high internal validity and low external validity, and therefore reliable recommendations can only be made for within the case study. These are discussed in the next section. Now that the ACF is proven applicable in this context, future research should employ a multiple-case design with controlled variables to deliver insights that are generalisable to the wider context of conservation conflicts, and thereby contribute to improving conservation globally.

5.2 Implications for the case study

There were indeed conservation conflicts underlying the HWC with wolves and boar at the case site. These occurred between individual stakeholders, as well as between coalitions. They were conflicts of interests, functions, and policy core beliefs. The most significant conflict involved the conservation and hunting coalitions, centred on the issue of wolf conservation. The consequences of this conflict included the economic losses and emotional distress of sheep farmers suffering damages, the restriction of the wolf population through poaching, and mutual distrust between farmers, gamekeepers, conservationists and other stakeholders. Damages caused by boar and the perception of gamekeepers’ mismanagement of the boar population further sowed distrust between farmers, gamekeepers, and other stakeholders. This lack of trust

inhibits cooperation between the coalitions (Ostrom, 2010). Trust between coalitions also suffers from misunderstandings of each other's beliefs. This fuels a 'devil-shift', where coalitions vilify each other (Sabatier, 1998). The conservation and hunting coalitions each misrepresented and exaggerated the beliefs of the other, with conservationists labelled incompetent or "extremists" (Gamekeeper 1, personal communication, January 24, 2022), and gamekeepers labelled uneducated or trigger-happy (PLA 2, personal communication, February 15, 2022).

HWC is a complex socio-ecological dilemma whose resolution demands the cooperation of the different stakeholder coalitions (Grossmann et al., 2020; Ostrom and Cox, 2010). Solutions should be acceptable to all parties. Solutions catering only to conservationists, farmers, or gamekeepers are unlikely to be accepted by the other stakeholders, and are unlikely to be sustainable without their support and involvement (Bodin, 2017; Reed et al., 2009). To achieve a more mutually acceptable system of management and conservation, it may be useful to explore the diverse set of problem framings and solutions put forward by different coalitions. Stakeholders were not necessarily prior aware of the lines of reasoning involved in the policy core beliefs and narratives of others. Outlining them here, with particular attention to commonalities between coalitions, may promote increased understanding between stakeholders, and perhaps lead to a renewed discussion of mutually acceptable solutions.

There were a great variety of solutions proposed to the problems related to wolf conservation and boar management, which can be explained by 1) the problems faced by the stakeholders are complex, are there likely no one solution or panacea to solve them (Ostrom and Cox, 2010); and 2) multiple preferred solutions logically follow from distinct problem framings, of which there were several. For instance, if the problem is framed as being caused by the animals, then likely solutions could include the lethal control of the animals; mitigation of wolf damage by securing sheep; or land sparing rather than sharing (see Figure 6). We can assess which problems are the most urgent and which solutions are the most mutually agreeable and viable, using belief and narrative networks. I have identified the system of subsidies and compensation for HWC-related damages and the preservation of the cultural landscape as the two most urgent problems with viable solutions. Cross-coalition cooperation is an important solution to conservation conflict, so I have also used the network analysis to identify bridging beliefs and narratives that coalitions can agree on, and bridging stakeholders who can act as moderators of discussion moderators or perhaps brokers of new cooperative relationships.

5.2.1 Improve the compensation and subsidy system

Secondary aspects regarding specific programs and institutions were frequently shared by members of different coalitions, and none moreso than the negative reactions to the current system of compensation and subsidies for HWC (see Appendix 12). This reflects a broader trend of applying financial compensation to the mitigation of HWC, which has had some success in promoting tolerance of HWC-damage, but also suffers from issues with implementation (Dickman et al., 2011; e.g. Mogomotsi et al., 2020). The compensation systems in the case site suffered from difficulties of applying for and receiving the compensation, and structural inequalities.

Members of all coalitions but the hunting coalition strongly expressed views about the system. The hunting coalition's exclusion is likely due to the fact that Farm 4 was a large industrialised farm, which tended to have less complaints about the subsidy system. Stakeholders explained that large industrial farms benefitted more from the compensation scheme, mostly due to their having the administrative resources to quickly complete the arduous application process. Small

farms meanwhile did not have the time or expertise to do so, and reported being unable to cope with costs accruing before the process' completion (e.g., Cons. 1, personal communication, February 2, 2022).

Improving the compensation and implementing subsidies could provide common ground for all of the coalitions to agree on and advocate for. Problems with the compensation system could be improved by streamlining the process, or alternatively could be mitigated by the rollout of a complementary subsidy system that provides farmers with the financial assistance to implement methods to protect their flocks from wolves. Instating this system is the main aim of the sheep farm coalition, and is also referenced by the Roznov and conservation coalitions. The likelihood of inter-coalition cooperation is increased by this solution being consistent with the policy core beliefs of the sheep farm, conservation, and Roznov coalitions. When narratives were graphed with secondary aspects, the hunting coalition was linked to the others through narratives of changing animal populations and the changing landscape (see Figure 9). The narratives further connected the other stakeholders, with the belief in the bad subsidy structure the most central in the network. The coalitions' shared narratives can therefore provide the impetus for discussions on mutually agreeable solutions to the issue of compensation and subsidies.

5.2.2 Protect the cultural landscape

All coalition members but the two PLAs shared a common deep core belief in the primacy of the cultural landscape over a wilder landscape. Cultural landscapes are unique for their human-nature relationships evolved over long time spans, and are recognised for their conservation value and distinct socio-cultural histories, among other things (Horcea-Milcu et al., 2018). The traditional cultural landscape of sheep pasture at the case study site may be eroding due to industrial agriculture, forest plantations, and increasing development (Chapron et al., 2014; Feranec et al., 2000; Kovařík et al., 2014). The frequency of the belief in the cultural landscape may therefore reflect a 'value change debt' (Horcea-Milcu et al., 2018), such that values (similar to core beliefs) that evolved in the historical cultural landscape may persist into the present and continue to inform stakeholders' behaviours, decisions, or narratives (Manfredo et al., 2016).

The deep core belief in the cultural landscape was related to policy core beliefs and narratives, and may serve to unite the coalitions in support of certain solutions. It was reflected in policy core beliefs such as understanding development as the cause of the problem, or prescribing the solutions of preserving the cultural landscape and returning to traditional methods of shepherding to protect flocks from wolves. This latter was related to the narrative that locals had 'forgotten how to coexist' peacefully with wolves, meaning that these traditional shepherding methods had been lost in the course of the wolves' absence from Czechia. Furthermore, the most central and bridging narrative across the network of coalitions *and* beliefs was that of the changing landscape (

Appendix 16). Most stakeholders therefore understood developments in their landscape to have been the most significant of all in influencing the present context of HWC and conservation conflict. More importantly, the concept of the cultural landscape provides a central understanding of the case study site that can be used as a point of departure for discussions of problems and solutions among diverse stakeholders.

A possible barrier to this could be that the PLAs, which have administrative jurisdiction to some extent over most of the case site, believed in achieving a wilder landscape. However, a wilder landscape and a cultural landscape are not mutually exclusive, particularly given the biodiversity and high conservation value of pastoral cultural landscapes (Horcea-Milcu et al., 2018). Solutions could be found that contribute to the restoration of both biodiversity and cultural activities and relationships. Solutions suggested by stakeholders can be differentiated

between 1) those centred on traditional shepherding, including the import of specialist breeds of protection dogs, keeping sheep in pasture by day and in enclosures at night; and 2) those centred on land-use, including placing controls on certain types of development in sensitive areas, particularly transport and tourism infrastructure, or incentivising the replacement of monocultures with pastures and flower meadows.

The cultural landscape is not fully defined, and there may be multiple competing interpretations among the stakeholders. For instance, Local govt. 2 perceived the return of the wolf and the growth in boar numbers as threats to the traditional cultural landscape of predominantly sheep pasture. Many of Local govt. 2s constituents are sheep farmers, and during the interview he spoke of them as custodians of the cultural landscape, and his duty to protect them. He explained that the economic costs of wolf damages were contributing to farmers transitioning from sheep farming to cattle, which are far less likely to be attacked. This was disputed by other stakeholders, and it is likely that economic pressures from the agricultural system are more to blame for this transition (Kovařík et al., 2014). Therefore, future research may focus first on engaging stakeholders to discuss these interpretations, and agree on common understandings, perhaps beginning from shared narratives identified here (Leventon et al., 2016; McAfee et al., 2020). Such studies could for instance take the form of participatory action research, which can be useful for stakeholders to arrive at common goals (Eelderink et al., 2020). That research could have a greater impact by identifying individuals that bridge coalitions in advance, and mobilising their connections to bring stakeholders together.

5.2.3 Bridging stakeholders

I identified six bridging stakeholders that contributed disproportionately to the cooperative ties of the network of 21 stakeholders (Table 4). 11 out of 21 stakeholders were members of coalitions, and five of those 11 were also bridging stakeholders. These included four members of the conservation coalition, and Gamekeeper 1 of the hunting coalition. The bridging stakeholders have the potential to promote greater connectivity in the overall network and catalyse cooperation among the coalitions (Bodin and Crona, 2009; Freeman, 1978).

Certain bridging stakeholders (Cons. 2 and 4, Local govt. 1) also held the most balanced beliefs, either by giving equal time in interviews to different beliefs and perspectives, or by expressing beliefs that were thematically more moderate or ‘middle of the road’ relative to those of other stakeholders. It is not clear whether this is a cause or a result of their betweenness, but it does indicate that these stakeholders could be especially useful in bridging coalitions, perhaps by first bridging the conceptual gaps between differing policy core beliefs. For example, Cons. 2 advocated for mitigating HWC by securing sheep with protection dogs and enclosures. This solution appeals to the other conservation stakeholders by allowing coexistence with wolves, it appeals to the hunting coalition by acting as a ‘natural control’ on the wolf population, by removing sheep from their predation (Farm 2, personal communication, February 15, 2022). If combined with an improved subsidy system (see 5.2.1) this solution could also appeal to the sheep farmers themselves.

5.3 Limitations

This section discusses the reliability and validity of the methods and results. In each case I discuss the main variables of cooperation, beliefs, and narratives, and I propose directions for future research. Finally, I discuss the internal and external validity and the generalisability of the research.

5.3.1 Reliability

Exploratory and qualitative research necessarily involves risks to reliability, and I took several steps to mitigate these risks during the data collection and analysis. Both the SNA and QCA were mostly based on interviews with 21 stakeholders, which risked systematic error being introduced by the interview process, for example through response biases. The associated risk of reliability was mitigated in part by the mixed method combining quantitative SNA and qualitative QCA. To increase the reliability of the interviews, the interview guide and questions were left as open-ended as possible and avoided leading questions. The guide is also publicly available for transparency and reproducibility (Appendix 1). Additionally, the results of the QCA of beliefs and narratives were triangulated with literature sources where possible. The test-retest reliability of the research was low since the dependent variable of cooperation was expected to continue to evolve over time. The internal consistency of measuring cooperation was increased by the pairwise measurement of cooperative ties from each stakeholder in a pair and the use of the average tie strength in the networks. The reliability of the coalitions derived from these ties was maximised by repeating the cluster analysis more than ten times from varying starting configurations (Appendix 3) to reduce random error biases.

QCA is associated with low interobserver reliability due to the inherent subjectivity of the researcher in identifying and categorising themes in the data. I have mitigated the risk this poses to the research reproducibility by being transparent with the coding process: 1) the codebooks and categorisation (hierarchies) are provided in Appendix 5 Appendix 11 for beliefs and Appendix 14 Appendix 15 for narratives; and 2) the full Nvivo project (.nvpx) file, including all transcripts, coded statements, and annotations can be shared upon request. The reliability of the measurement of beliefs was improved through the use of illustrative components from the ACF (Sabatier, 1998) as a top-down guide. This turned out to be especially useful for defining themes in response to which stakeholders (and coalitions) had differing beliefs. The measurement of narratives however was fully bottom-up with no guiding framework available and was therefore particularly susceptible to low interobserver reliability. This could be rectified in future research as discussed in section 5.2.

5.3.2 Validity

The validity of the measurement of variables varied, providing opportunities for future research. Using coalitions as an indicator for cooperation may have reduced the content validity of the measurement by not representing other aspects of cooperation. The Roznov coalition for example appeared to cooperate based on geographic proximity, while other cooperative ties may have been based on organisational role requirements. Beliefs were measured using a combined top-down and bottom-up approach which found a middle ground between reflecting real-world beliefs held by the stakeholders, and empirically validated themes and components of beliefs (Sabatier, 1988, 1998; Weible, 2007). The measurement of beliefs was validated by their consistency with the coalitions as predicted by the theoretical framework. This was not the case for the measurement of narratives. The third explanation for the inconclusive results to SQ3 (see section 5.1) is that stakeholders' narratives have poor construct validity as a measurement tool for the influence of historical developments). If this is the case, future research should try to identify more valid measurements of the influence of historical developments, or in the ideal situation, perform a longitudinal analysis of beliefs and cooperation at the case site. Another option would be to repeat a case study of beliefs, values or attitudes related to conservation conflict at the case site at intervals of 10 years or more. For example, Kutal et al. (2018) surveyed public perceptions and media content at the site in 2000 and 2010. This research could be repeated in the contemporary context with added attention to the changing socio-economic context. This would approach the scale dealt with by the ACF

and allow for a more valid measurement of the influence of historical developments on conservation at the case site, building on the relationship between beliefs and conservation established by my research.

Internal and external validity

As described in section 3.2.2, I decided to generate an in-depth understanding of the case site at the expense of generalisability to other cases of conservation conflict (Baxter and Jack, 2008; Seawright and Gerring, 2008). One means to improve the generalisability of the research design would be to have used a larger sample of stakeholders. This would likely yield more coalitions with larger memberships, and provide more valid comparisons between them. This could be implemented by removing step four from the sampling method described in section 3.3.1.

This relates to the notable finding of higher representation and cooperation among conservationist stakeholders than hunting or farming stakeholders. Although farmers and gamekeepers were likely to make up the largest populations of potential stakeholders, there were sampled at similar numbers to other stakeholder types. Additionally, there were less coalitions and with smaller memberships that represented farming and hunting interests than were expected. And finally, the four most bridging stakeholders were all members of the conservation coalition. There are two possible interpretations of these findings: 1) this was the result of a sampling error, introducing a bias towards the inclusion of conservation stakes; and 2) this is a true reflection of the stakeholder cooperation landscape.

The sampling error in interpretation 1 could possibly have resulted from an underrepresentation of farmers and gamekeepers. Several participants alerted us to the fact that some locals may have had negative prior experiences of scientific research and may feel that research tended to be ‘on the side of’ wildlife. They may see research as contributing to land-use and environmental policies making life more difficult for them. This may have resulted in an underrepresentation of sheep farmers and gamekeepers, who ostensibly have the most to lose from the wolf’s comeback. This could have the knock-on effect of stakeholders with bridging roles in boar management and sheep farming not being included in the sample. To mitigate this, the participation phase made explicitly the social-focus of the research, rather than an ecological focus.

There are several strands of reasoning to justify the second interpretation. The small size of the hunting coalition and the lack of other similar coalitions may indicate that cooperation on boar hunting and against wolf conservation is more fragmented than cooperation to conserve the wolf, and may also occur on a more local level than the regional and international level involved in wolf conservation. For example, poaching is an illegal activity that is presumed to occur on small and very localised scale, responsible for very few deaths among wolves each year KUTAL. Boar-hunting meanwhile operates on a local scale for practical reasons, and usually involves a farmer spotting a boar or recent boar-related damages, and then alerting the local gamekeepers who come and hunt the animal (Farm 1, personal communication, February 22, 2022). This is the traditional means of boar management, and no other cooperative relationships are required. Therefore the hunting coalition can be assumed to be representative of other potential gamekeeping and farming stakeholders who may not have been identified by the sampling.

In contrast to boar management, effective wolf conservation indeed requires the coordination of multiple actors over a large area, as individual wolves and packs can cover very large distances (Mattisson et al., 2013). The wolf population at the case site is growing (Hulva et al., 2018), which could suggest that wolf conservation has been successful (Kutal et al., 2018). It

is therefore unsurprising that there is a coalition of stakeholders bridging other stakeholder groups to conserve wolves. The conservation coalition are also responsible for most of the cross-border cooperation between Czechia and Slovakia, most likely because of the cross-border movement of the wolf population. Boar management and sheep farming, on the other hand, appear to involve more localised cooperation between smaller numbers of less diverse stakeholders. These functions therefore appear more fragmented in the network, with less cooperative ties, smaller coalitions, and low betweenness centrality.

6 Conclusions

With this research I set out to answer the research question ‘*How does local history influence stakeholder cooperation in the conservation and management of wolves and wild boar in the Western Carpathians?*’. In conclusion, I was ultimately unable to definitively explain how local historical context influences stakeholder cooperation in conservation and management. I was however able to show that stakeholders’ historical narratives increased their overall network connectivity by bridging separate coalitions. I also showed that stakeholders were arranged into functional cooperating coalitions, and that policy core beliefs drive cooperation by gluing these coalitions together. Furthermore, I identified key bridging stakeholders and beliefs, which together with the narratives I identified, may provide opportunities for improved communication, trust, and cooperation in conservation and management.

It was clear from stakeholders’ accounts that the local history had somehow shaped their lives and consequently their interactions, whether through the changing landscape, the ebb and flow of institutions, or the gradual shift in beliefs and values. As informative and engaging as their narratives were however, they alone were insufficient to define a causative relationship to the stakeholders’ collective conservation dilemmas. Future research ought to employ a longitudinal analysis to more rigorously examine the relationship between macro-level developments and conservation conflicts.

Such research would continue the work begun here of highlighting the gap in our understanding of the social factors underlying conservation conflicts and HWC. In particular, the results demonstrate the suitability of a mixed method approach combining the advocacy coalition framework and network theory for HWC research. This combination was uniquely applicable for relating individual-level perspectives to group-level dynamics. This approach appears to hold great explanatory potential in expanding the social science dimension of HWC and conservation research. The ACF was already a trusted framework applied in other disciplines, and can hopefully continue to provide robust results when combined with larger-n case studies and comparative case studies of similar conservation conflicts. Future research using the ACF should also integrate the NPF to empirically build on the relationship between stakeholders’ beliefs, narratives, and cooperation.

Perhaps the most useful characteristic of the ACF was the systematic extraction of stakeholders’ understandings of the problems they face, and their ideas for solutions. The greatest relevance of this research should be for the case site and stakeholders themselves. It is my hope that I have shed light on the issues they face, but more importantly, that my results give cause for optimism that the issues they face may be overcome through engagement, discussion, trust, and cooperation. Stakeholders might use my results to open discussions among the various coalitions on the shared benefits of an improved HWC compensation-and-subsidy scheme. This initiative could come as the first step in a project to jointly conserve the unique heritage of the cultural landscape, by supporting sheep farmers, adopting mutually agreeable means of protecting sheep, and promoting tolerance of and coexistence with wolves. Future research might assist the stakeholders (or learn from them) through participatory action research. This could involve engaging stakeholders in discussion and workshops, beginning from shared narratives of the past, and with the aim of developing shared management practices and solutions to HWC (Eelderink et al., 2020; Leventon et al., 2016; McAfee et al., 2020).

Such an initiative may eventually become the ‘historical development’ that led to former rival coalitions cooperating with each other and coexisting peacefully with wolves and wild boar in the Western Carpathians. As the wolf continues its European comeback, the Western

History, beliefs, and cooperation in conservation

Carpathians may become an example of formerly conflicting groups finding mutually agreeable solutions and tolerating damaging species in their shared landscapes. As the human population grows and frontier communities increasingly live alongside increasingly precious wildlife, it will only become more important for conservation science to provide us lessons in sharing landscapes with animals, and with each other

7 References

- Ahmadi, A., Kerachian, R., Rahimi, R., and Emami Skardi, M. J. (2019). Comparing and combining Social Network Analysis and Stakeholder Analysis for natural resource governance. *Environmental Development*, 32, 100451. <https://doi.org/10.1016/J.ENVDEV.2019.07.001>
- Baxter, P., and Jack, S. (2008). Qualitative case study methodology: study design and implementation for novice researchers. *The Qualitative Report*, 13(4), 544–559. <https://doi.org/10.46743/2160-3715/2008.1573>
- Bodin, Ö. (2017). Collaborative environmental governance: Achieving collective action in social-ecological systems. *Science*, 357(6352). <https://doi.org/10.1126/science.aan1111>
- Bodin, Ö., and Crona, B. I. (2009). The role of social networks in natural resource governance: What relational patterns make a difference? *Global Environmental Change*, 19(3), 366–374. <https://doi.org/10.1016/J.GLOENVCHA.2009.05.002>
- Bodin, Ö., García, M. M., and Robins, G. (2020). Reconciling Conflict and Cooperation in Environmental Governance: A Social Network Perspective. *Annual Review of Environment and Resources*, 45, 471–495. <https://doi.org/10.1146/ANNUREV-ENVIRON-011020-064352>
- Borgatti, S. P., Everett, M. G., and Johnson, J. C. (2018). *Analyzing Social Networks* (2nd ed.). SAGE. https://books.google.com/books/about/Analyzing_Social_Networks.html?hl=nlandid=-gpEDwAAQBAJ
- Breyne, J., Abildtrup, J., and Maréchal, K. (2021). The wolves are coming: understanding human controversies on the return of the wolf through the use of socio-cultural values. *European Journal of Wildlife Research*, 67(5), 1–17. <https://doi.org/10.1007/S10344-021-01527-W/TABLES/8>
- Bruskotter, J. T., Vucetich, J. A., Manfredo, M. J., Karns, G. R., Wolf, C., Ard, K., Carter, N. H., López-Bao, J. V., Chapron, G., Gehrt, S. D., and Ripple, W. J. (2017). Modernization, Risk, and Conservation of the World’s Largest Carnivores. *BioScience*, 67(7), 646–655. <https://doi.org/10.1093/BIOSCI/BIX049>
- Chapron, G., Kaczensky, P., Linnell, J. D. C., von Arx, M., Huber, D., Andrén, H., López-Bao, J. V., Adamec, M., Álvares, F., Anders, O., Balečiauskas, L., Balys, V., Bedő, P., Bego, F., Blanco, J. C., Breitenmoser, U., Brøseth, H., Bufka, L., Bunikyte, R., ... Boitani, L. (2014). Recovery of large carnivores in Europe’s modern human-dominated landscapes. *Science*, 346(6216), 1517–1519. <https://doi.org/10.1126/science.1257553>
- Cwynar, P., Stojkov, J., and Wlazlak, K. (2019). African Swine Fever Status in Europe. *Viruses* 2019, Vol. 11, Page 310, 11(4), 310. <https://doi.org/10.3390/V11040310>
- Dahlstrom, M. F. (2010). The Role of Causality in Information Acceptance in Narratives: An Example From Science Communication. *Communication Research*, 37(6), 857–875. <https://doi.org/10.1177/0093650210362683>
- Dickman, A. J. (2010). Complexities of conflict: the importance of considering social factors for effectively resolving human–wildlife conflict. *Animal Conservation*, 13(5), 458–466. <https://doi.org/10.1111/J.1469-1795.2010.00368.X>
- Dickman, A. J., Macdonald, E. A., and Macdonald, D. W. (2011). A review of financial instruments to pay for predator conservation and encourage human-carnivore coexistence. *PNAS*, 108(34), 13937–13944. <https://doi.org/https://doi.org/10.1073/pnas.101297210>
- Dietsch, A. M., Teel, T. L., and Manfredo, M. J. (2016). Social values and biodiversity conservation in a dynamic world. *Conservation Biology*, 30(6), 1212–1221. <https://doi.org/10.1111/cobi.12742>

- Eelderink, M., Vervoort, J. M., and van Laerhoven, F. (2020). Using participatory action research to operationalize critical systems thinking in social-ecological systems. *Ecology and Society*, 25(1). <https://doi.org/10.5751/ES-11369-250116>
- Fagin, A. (2000). Environmental Protest in the Czech Republic: Three Stages of Post-Communist Development. *Czech Sociological Review*, 36(2), 139–156. <https://doi.org/10.13060/00380288.2000.36.12.03>
- Feranec, J., Šůri, M., Ot'ahel, J., Cebecauer, T., Kolář, J., Soukup, T., and Nitica, C. (2000). Inventory of major landscape changes in the Czech Republic, Hungary, Romania and Slovak Republic 1970s-1990s. *International Journal of Applied Earth Observation and Geoinformation*, 2(2), 129–139. [https://doi.org/https://doi.org/10.1016/S0303-2434\(00\)85006-0](https://doi.org/https://doi.org/10.1016/S0303-2434(00)85006-0)
- Ficetola, G. F., Bonardi, A., Mairota, P., Leronni, V., and Padoa-Schioppa, E. (2014). Predicting wild boar damages to croplands in a mosaic of agricultural and natural areas. *Current Zoology*, 60(2), 170–179. <https://doi.org/10.1093/CZOOL0/60.2.170>
- Freeman, L. C. (1978). Centrality in social networks conceptual clarification. *Social Networks*, 1(3), 215–239. [https://doi.org/10.1016/0378-8733\(78\)90021-7](https://doi.org/10.1016/0378-8733(78)90021-7)
- Gardner, D. (2005). Ten Lessons in Collaboration. *The Online Journal of Issues in Nursing*, 10(1). https://ojin.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume102005/No1Jan05/tpc26_116008.aspx#Follett40
- Gerring, J. (2004). What is a case study and what is it good for? *American Political Science Review*, 98(2), 341–354. <https://doi.org/10.1017/S0003055404001182>
- Glenn, J. K. (1999). Competing challengers and contested outcomes to state breakdown: The velvet revolution in Czechoslovakia. *Social Forces*, 78(1), 187–212. <https://doi.org/10.2307/3005794>
- Glover, F. (1989). Tabu Search—Part I. *ORSA Journal on Computing*, 1(3), 190–206. <https://doi.org/10.1287/IJOC.1.3.190>
- Gokhale, C. S., Bulbulia, J., and Frean, M. (2022). Collective narratives catalyse cooperation. *Humanities and Social Sciences Communications*, 9(1), 1–9. <https://doi.org/10.1057/s41599-022-01095-7>
- Grossmann, C. M., Patkó, L., Ortseifen, D., Kimmig, E., Cattoen, E. M., and Schraml, U. (2020). Human-Large Carnivores Co-existence in Europe – A Comparative Stakeholder Network Analysis. *Frontiers in Ecology and Evolution*, 8, 266. <https://doi.org/10.3389/FEVO.2020.00266/BIBTEX>
- Gutiérrez, R. J., Wood, K. A., Redpath, S. M., and Young, J. C. (2016). Conservation Conflicts: Future Research Challenges. *Wildlife Research Monographs*, 1, 267–282. https://doi.org/10.1007/978-3-319-27912-1_11
- Hanneman, R. A., and Riddle, M. (2005). Working with NetDraw to visualize graphs. In *Introduction to social network methods* (pp. 31–52). University of California. published in digital form at <http://faculty.ucr.edu/~hanneman/>
- Horcea-Milcu, A. I., Abson, D. J., Dorresteijn, I., Loos, J., Hanspach, J., and Fischer, J. (2018). The role of co-evolutionary development and value change debt in navigating transitioning cultural landscapes: the case of Southern Transylvania. *Journal of Environmental Planning and Management*, 61(5–6), 800–817. <https://doi.org/10.1080/09640568.2017.1332985>
- Hulva, P., Černá Bolfíková, B., Woznicová, V., Jindřichová, M., Benešová, M., Mysłajek, R. W., Nowak, S., Szewczyk, M., Niedźwiecka, N., Figura, M., Hájková, A., Sándor, A. D., Zyka, V., Romportl, D., Kutal, M., Find'o, S., and Antal, V. (2018). Wolves at the crossroad: Fission–fusion range biogeography in the Western Carpathians and Central Europe. *Diversity and Distributions*, 24(2), 179–192. <https://doi.org/10.1111/DDI.12676>

- Ihemezie, E. J., Nawrath, M., Strauß, L., Stringer, L. C., and Dallimer, M. (2021). The influence of human values on attitudes and behaviours towards forest conservation. *Journal of Environmental Management*, 292, 112857. <https://doi.org/10.1016/J.JENVMAN.2021.112857>
- Ives, C. D., and Kendal, D. (2014). The role of social values in the management of ecological systems. *Journal of Environmental Management*, 144, 67–72. <https://doi.org/10.1016/J.JENVMAN.2014.05.013>
- Jasny, L., Johnson, M., Campbell, L. K., Svendsen, E., Redmond, J., Jasny, L., Johnson, M., Campbell, L. K., Svendsen, E., and Redmond, J. (2019). Working together: the roles of geographic proximity, homophilic organizational characteristics, and neighborhood context in civic stewardship collaboration networks in Philadelphia and New York City. *Ecology and Society*, 24(4). <https://doi.org/10.5751/ES-11140-240408>
- Jenkins-Smith, H. C., Nohrstedt, D., Weible, C. M., and Ingold, K. (2018). The Advocacy Coalition Framework: An Overview of the Research Program. In C. M. Weible and P. A. Sabatier (Eds.), *Theories of the Policy Process* (4th ed., pp. 135–171). Routledge. <https://doi.org/10.4324/9780429494284-5>
- Kaiser, F. G., Hübner, G., and Bogner, F. X. (2005). Contrasting the Theory of Planned Behavior With the Value-Belief-Norm Model in Explaining Conservation Behavior1. *Journal of Applied Social Psychology*, 35(10), 2150–2170. <https://doi.org/10.1111/J.1559-1816.2005.TB02213.X>
- König, H. J., Ceaușu, S., Reed, M., Kendall, H., Hemminger, K., Reinke, H., Ostermann-Miyashita, E.-F., Wenz, E., Eufemia, L., Hermanns, T., Klose, M., Spyra, M., Kuemmerle, T., and Ford, A. T. (2021). Integrated framework for stakeholder participation: Methods and tools for identifying and addressing human–wildlife conflicts. *Conservation Science and Practice*, 3(3), e399. <https://doi.org/10.1111/CSP2.399>
- Konvička, L., and Kavan, J. (1994). Youth Movements and the Velvet Revolution. *Communist and Post-Communist Studies*, 27(2), 160–176. [https://doi.org/https://doi.org/10.1016/0967-067X\(94\)90023-X](https://doi.org/https://doi.org/10.1016/0967-067X(94)90023-X)
- Kovařík, P., Kutal, M., and Machar, I. (2014). Sheep and wolves: Is the occurrence of large predators a limiting factor for sheep grazing in the Czech Carpathians? *Journal for Nature Conservation*, 22(5), 479–486. <https://doi.org/10.1016/J.JNC.2014.06.001>
- Kutal, M., and Dula, M. (2020). Evidence-based hunting policy needed in Slovakia. *Science*, 370(6521), 1174. <https://doi.org/DOI:10.1126/science.abf515>
- Kutal, M., Kovařík, P., Kutalová, L., Bojda, M., and Dušková, M. (2018). Attitudes towards large carnivore species in the West Carpathians: Shifts in public perception and media content after the return of the wolf and the bear. In *Large Carnivore Conservation and Management* (1st ed., pp. 168–189). Routledge. <https://doi.org/10.4324/9781315175454-9>
- Kutal, M., Váňa, M., Suchomel, J., Chapron, G., and López-Bao, J. V. (2016). Trans-Boundary Edge Effects in the Western Carpathians: The Influence of Hunting on Large Carnivore Occupancy. *PLOS ONE*, 11(12), e0168292. <https://doi.org/10.1371/JOURNAL.PONE.0168292>
- Lam, D. P. M., Martín-López, B., Horcea-Milcu, A. I., and Lang, D. J. (2021). A leverage points perspective on social networks to understand sustainability transformations: evidence from Southern Transylvania. *Sustainability Science*, 16(3), 809–826. <https://doi.org/10.1007/S11625-020-00881-Z/FIGURES/7>
- Leonard-Barton, D. (1990). A Dual Methodology for Case Studies: Synergistic Use of a Longitudinal Single Site with Replicated Multiple Sites. *Organization Science*, 1(3), 248–266. <https://doi.org/https://doi.org/10.1287/orsc.1.3.248>

- Leventon, J., Fleskens, L., Claringbould, H., Schwilch, G., and Hessel, R. (2016). An applied methodology for stakeholder identification in transdisciplinary research. *Sustainability Science*, 11(5), 763–775. <https://doi.org/10.1007/S11625-016-0385-1/TABLES/3>
- Levi, M., and Williams, M. L. (2013). Multi-agency partnerships in cybercrime reduction: Mapping the UK information assurance network cooperation space. *Information Management and Computer Security*, 21(5), 420–443. <https://doi.org/10.1108/IMCS-04-2013-0027/FULL/PDF>
- Lipsky, R. S., and Ryan, C. M. (2011). Nearshore Restoration in Puget Sound: Understanding Stakeholder Values and Potential Coalitions. *Coastal Management*, 39(6), 577–597. <https://doi.org/10.1080/08920753.2011.600241>
- Lynne, G. D., Shonkwiler, J. S., and Rola, L. R. (1988). Attitudes and Farmer Conservation Behavior. *American Journal of Agricultural Economics*, 70(1), 12–19. <https://doi.org/10.2307/1241971>
- Manfredo, M. J., Berl, R. E. W., Teel, T. L., and Bruskotter, J. T. (2021). Bringing social values to wildlife conservation decisions. *Frontiers in Ecology and the Environment*, 19(6), 355–362. <https://doi.org/10.1002/FEE.2356>
- Manfredo, M. J., Teel, T. L., Carlos, A. W. D., Sullivan, L., Bright, A. D., Dietsch, A. M., Bruskotter, J., and Fulton, D. (2020). The changing sociocultural context of wildlife conservation. *Conservation Biology: The Journal of the Society for Conservation Biology*, 34(6), 1549–1559. <https://doi.org/10.1111/COBI.13493>
- Manfredo, M. J., Teel, T. L., and Dietsch, A. M. (2016). Implications of human value shift and persistence for biodiversity conservation. *Conservation Biology*, 30(2), 287–296. <https://doi.org/10.1111/cobi.12619>
- Manfredo, M. J., Teel, T. L., Don Carlos, A. W., Sullivan, L., Bright, A. D., Dietsch, A. M., Bruskotter, J., and Fulton, D. (2020). The changing sociocultural context of wildlife conservation. *Conservation Biology*, 34(6), 1549–1559. <https://doi.org/10.1111/COBI.13493>
- Mattisson, J., Sand, H., Wabakken, P., Gervasi, V., Liberg, O., Linnell, J. D. C., Rauset, G. R., and Pedersen, H. C. (2013). Home range size variation in a recovering wolf population: Evaluating the effect of environmental, demographic, and social factors. *Oecologia*, 173(3), 813–825. <https://doi.org/10.1007/S00442-013-2668-X/FIGURES/4>
- McAfee, D., Alleway, H. K., and Connell, S. D. (2020). Environmental solutions sparked by environmental history. *Conservation Biology*, 34(2), 386–394. <https://doi.org/10.1111/COBI.13403>
- Melis, C., Szafrńska, P. A., Jędrzejewska, B., and Bartoń, K. (2006). Biogeographical variation in the population density of wild boar (*Sus scrofa*) in western Eurasia. *Journal of Biogeography*, 33(5), 803–811. <https://doi.org/10.1111/J.1365-2699.2006.01434.X>
- Mogomotsi, P. K., Stone, L. S., Mogomotsi, G. E. J., and Dube, N. (2020). Factors influencing community participation in wildlife conservation. *Human Dimensions of Wildlife*, 25(4), 372–386. <https://doi.org/10.1080/10871209.2020.1748769>
- Nyhus, P. J. (2016). Human–Wildlife Conflict and Coexistence. *Annual Review of Environment and Resources*, 41(1), 143–171. <https://doi.org/10.1146/ANNUREV-ENVIRON-110615-085634>
- O’Neill, X., White, A., Ruiz-Fons, F., and Gortázar, C. (2020). Modelling the transmission and persistence of African swine fever in wild boar in contrasting European scenarios. *Scientific Reports 2020 10:1*, 10(1), 1–10. <https://doi.org/10.1038/s41598-020-62736-y>
- Ostrom, E. (2010). Beyond Markets and States: Polycentric Governance of Complex Economic Systems. *American Economic Review*, 100(3), 641–672. <https://doi.org/10.1257/AER.100.3.641>

- Ostrom, E., and Cox, M. (2010). Moving beyond panaceas: a multi-tiered diagnostic approach for social-ecological analysis. *Environmental Conservation*, 37(4), 451–463. <https://doi.org/10.1017/S0376892910000834>
- Prell, C., Hubacek, K., and Reed, M. (2009). Stakeholder Analysis and Social Network Analysis in Natural Resource Management. *Society and Natural Resources*, 22(6), 501–518. <https://doi.org/10.1080/08941920802199202>
- Redpath, S. M., Young, J., Evely, A., Adams, W. M., Sutherland, W. J., Whitehouse, A., Amar, A., Lambert, R. A., Linnell, J. D. C., Watt, A., and Gutiérrez, R. J. (2013). Understanding and managing conservation conflicts. *Trends in Ecology and Evolution*, 28(2), 100–109. <https://doi.org/10.1016/j.tree.2012.08.021>
- Reed, M. S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., Prell, C., Quinn, C. H., and Stringer, L. C. (2009). Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management*, 90(5), 1933–1949. <https://doi.org/10.1016/j.jenvman.2009.01.001>
- Rode, J., Flinzberger, L., Karutz, R., Berghöfer, A., and Schröter-Schlaack, C. (2021). Why so negative? Exploring the socio-economic impacts of large carnivores from a European perspective. *Biological Conservation*, 255. <https://doi.org/https://doi.org/10.1016/j.biocon.2020.108918>
- Sabatier, P. A. (1988). An advocacy coalition framework of policy change and the role of policy-oriented learning therein. *Policy Sciences 1988 21:2*, 21(2), 129–168. <https://doi.org/10.1007/BF00136406>
- Sabatier, P. A. (1998). The advocacy coalition framework: revisions and relevance for Europe. *Journal of European Public Policy*, 5(1), 98–130. <https://doi.org/10.1080/13501768880000051>
- Sabatier, P. A., and Jenkins-Smith, H. C. (1993). Policy change and learning: an advocacy coalition approach. In *Policy change and learning: an advocacy coalition approach*. Westview Press.
- Sabatier, P. A., and Weible, C. M. (2007). The advocacy coalition framework. In P. A. Sabatier (Ed.), *Theories of the policy process* (2nd ed., pp. 189–220). Westview.
- Satoh, K., Gronow, A., and Ylä-Anttila, T. (2021). The Advocacy Coalition Index: A new approach for identifying advocacy coalitions. *Policy Studies Journal*, 00, 1–21. <https://doi.org/10.1111/PSJ.12450>
- Seawright, J., and Gerring, J. (2008). Case Selection Techniques in Case Study Research A Menu of Qualitative and Quantitative Options. *Political Research Quarterly*, 61(2), 294–308. <https://doi.org/10.1177/1065912907313077>
- Šerek, J., Macek, P., Ježek, S., and Lacinová, L. (2014). Twenty Years After the Velvet Revolution: Shifts in Czech Adolescents' Perceptions of Family, School, and Society. *Journal of Adolescent Research*, 29(6), 738–764. <https://doi.org/10.1177/0743558414538315>
- Shanahan, E. A., Jones, M. D., and Mcbeth, M. K. (2011). Policy Narratives and Policy Processes. *Policy Studies Journal*, 39(3), 535–561. <https://doi.org/10.1111/J.1541-0072.2011.00420.X>
- Shanahan, E. A., Jones, M. D., Mcbeth, M. K., and Lane, R. R. (2013). An Angel on the Wind: How Heroic Policy Narratives Shape Policy Realities. *Policy Studies Journal*, 41(3), 453–483. <https://doi.org/10.1111/PSJ.12025>
- Swain, N. (1999). Agricultural Restitution and Co-operative Transformation in the Czech Republic, Hungary and Slovakia. *Europe-Asia Studies*, 51(7), 1199–1219. <https://doi.org/https://doi.org/10.1080/09668139998507>

- Wagner, P., and Ylä-Anttila, T. (2018). Who got their way? Advocacy coalitions and the Irish climate change law. *Environmental Politics*, 27(5), 872–891. <https://doi.org/https://doi.org/10.1080/09644016.2018.1458406>
- Weible, C. M. (2007). An Advocacy Coalition Framework Approach to Stakeholder Analysis: Understanding the Political Context of California Marine Protected Area Policy. *Journal of Public Administration Research and Theory*, 17(1), 95–117. <https://doi.org/10.1093/JOPART/MUJ015>
- Weible, C. M., Sabatier, P. A., Jenkins-Smith, H. C., Nohrstedt, D., Henry, A. D., and deLeon, P. (2011). A Quarter Century of the Advocacy Coalition Framework: An Introduction to the Special Issue. *Policy Studies Journal*, 39(3), 349–360. <https://doi.org/10.1111/J.1541-0072.2011.00412.X>
- Young, J., Richards, C., Fischer, A., Halada, L., Kull, T., Kuzniar, A., Tartes, U., Uzunov, Y., and Watt, A. (2007). Conflicts between Biodiversity Conservation and Human Activities in the Central and Eastern European Countries. *AMBIO: A Journal of the Human Environment*, 36(7), 545–550. [https://doi.org/10.1579/0044-7447\(2007\)36\[545:CBBCAH\]2.0.CO;2](https://doi.org/10.1579/0044-7447(2007)36[545:CBBCAH]2.0.CO;2)

8 Appendix

Appendix 1 Interview guide questionnaire.....	65
Appendix 2 Affiliation network.	73
Appendix 3 Freeman betweenness centrality analysis.....	74
Appendix 4 Clustering optimisation.	75
Appendix 5 Secondary aspects hierarchy.	76
Appendix 6 Secondary aspects codebook.....	76
Appendix 7 Policy core belief hierarchy.	77
Appendix 8 Policy core belief codebook.....	78
Appendix 9 Aggregation of policy core beliefs to deep core beliefs.....	82
Appendix 10 Deep core belief hierarchy.	83
Appendix 11 Deep core belief codebook.....	83
Appendix 12 Coalitions and secondary aspects.....	87
Appendix 13 Coalitions and policy core beliefs regarding ideal solutions.	87
Appendix 14 Historical narrative codebook.	88
Appendix 15 Coalitions and alternate narrative categories.	90
Appendix 16 Network of coalitions, historical narratives, and beliefs.....	90

Appendix 1 Interview guide questionnaire.

Stakeholder ID: _____

Date: _____

Interview guide: Stakeholders, cooperation, values, and historical context

Completed by: (researcher /stakeholder/researcher and stakeholder) _____

Name: _____ Organisation: _____

Will you be representing this organisation's perspective here? Yes No, I speak for myself

Gender: Female Male Country: CZ SK

Location: _____ Website: _____

Easiest way to contact: _____

Size: Individual 2-10 people 11-50 people 50+ people

I Information sheet and informed consent (~10 mins)

We are Marek Bock, Adéla Pohořelá and Brian Reilly, and we are students in a research project for Charles University in Prague and Utrecht University in the Netherlands. The research project is about the way that wild animals and people live together.

[Background information, if asked for: In many parts of Europe, wild animals such as the wolf, lynx and wild boar are currently coming back into the landscapes. However, there are very different views in society about wildlife coming back, which makes it uncertain how people and wildlife will interact in the future. Because landscapes in Europe are often densely populated, people and wildlife interact all the time. Conflicts happen especially when wildlife damage people's land, crops, or livestock, but also occur when different stakeholders have different ideas on how to manage wildlife. That is why the interactions between people and wildlife are a big sustainability issue for both people's livelihoods and biodiversity conservation.]

Land-use change, such as changes in forest cover, can make wildlife conflicts worse because it changes how, where and when wildlife and people come into contact. Conflicts are also influenced by the history of interactions and adaptations between people and wildlife in a place. At the moment, though, neither land-use changes nor the history of a place is given much attention in strategies to reduce human-wildlife conflicts. In this research project we aim to better understand the effects of land-use change and history on human-wildlife interactions. We do our research in the Beskid Mountains in the Czech Republic and Slovakia. For our research, we would like to use camera traps to study mammals inside the forests and outside the forests on pastures and agricultural fields. We also want to conduct interviews with local stakeholders to understand how they value and perceive wildlife and the interactions between people and wildlife.

In this interview we are collecting information about stakeholders in wildlife management and conservation in the region. We want to create a map or network of these stakeholders and their work connections to each other. For this, we are doing some initial interviews, and we would therefore like to ask some questions to you. Stakeholders are those people or organisations who affect or who are affected by wildlife management or conservation. In these early interviews, we are particularly interested in how stakeholders work together in efforts to manage or conserve wolves and wild boar in the area, and how this cooperation might be influenced by the local beliefs and history. Most of our questions will be about your situation right now, but we would also like to understand how the situation has changed over the past decades.

Stakeholder ID: _____

The results from this research will help us understand the opportunities and barriers for people and wildlife to share the same landscape. We want to make the research relevant for local stakeholders by engaging them in the research, for example by developing ideas about possible futures in which we can live with wild animals but reduce the conflicts with them.

The interview is structured in three sections. We will first ask you about your (or your organisation's) role and your interactions with other stakeholders. Then we will ask you a bit about your beliefs in relation to wildlife, and how you think things may (or may not) have changed over the past 30 years. This part we would like to record, if you are comfortable with that. In the end we will ask you some questions whether you would be willing to be part of the research project in the future. Our questions will take about an hour in total. How much time do you have? We want to thank you in advance for talking to us; and we really appreciate you giving us your time.

Before we start, we would like to ask if you have understood the objectives of our research and your participation in the interview? Are there any other questions that you would like to ask? If you have questions during the interview, you can always ask them. If you ever feel uncomfortable with the interview, we can stop at any time.

Do you agree to participate in this interview? Yes No

Do you agree for part III to be recorded? Yes No

Witness for voluntary consent: _____

If it is okay for you, we can now get started with some questions about your involvement in this context.

II Organisations and cooperation (~20 mins)

We will first ask you some questions about you or your organisation's interests in the management or conservation of wolves and wild boar. We would then like your help in identifying other relevant stakeholders. Finally, we would like to know a bit about whether and how you work with any of the stakeholders you mention.

Defining stakeholders' interests

'Stakeholders' include organizations and individuals who affect or are affected by the management or conservation of either wolves or boar. Their stake is the thing connecting them to management or conservation. The following questions should be answered only in the context of the management or conservation of either wolves or boar.

1a. Do you or your organization have an interest related to wolves, boar, or both?

Wolves Boar Both

1b. What is the physical or administrative **area** that you are interested in?

Stakeholder ID: _____

2a. What **sector** do you or your organisation belong to?

- | | | | | |
|--------------------------------|-------------------------------|----------------------------------|----------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Government</i> | <i>Non-profit</i> | <i>Academia</i> | <i>Public enterprise</i> | <i>Association</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Private sector – retail</i> | <i>Private sector - other</i> | <i>Private sector - industry</i> | <i>Private individuals</i> | <i>Other: _____</i> |

2b. What is your (organisation's) **role or form of interest**? Please tick all that apply, and then underline the primary or most important role.

- | | | | | |
|-----------------------------|--------------------------------------|------------------------------|-------------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Agriculture farming</i> | <i>Livestock farming</i> | <i>Gamekeeping</i> | <i>Forestry</i> | <i>Resident</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Education</i> | <i>Recreation</i> | <i>Producer</i> | <i>Tourism operator</i> | <i>Land-use planning</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Hobby hunting</i> | <i>Policymaking</i> | <i>Administration</i> | <i>Ministry</i> | <i>Scientist</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Landowner</i> | <i>Land management</i> | <i>Consumer</i> | <i>Env. protection</i> | <i>Consulting</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Supplier</i> | <i>Retail</i> | <i>Financing</i> | <i>Marketing</i> | <i>Campaigning</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Community leader</i> | <i>Security</i> | <i>Construction</i> | <i>Conservation</i> | <i>Research</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Information provider</i> | <i>Assistance for public funding</i> | <i>Product certification</i> | <i>Monitoring/enforcement</i> | <i>Other: _____</i> |

3a. What is your **main aim** regarding wolf and boar management or conservation in the area?
E.g., You provide advice to farmers on methods for mitigating wildlife-caused damages.

3b. Do you belong to any organisations related to local management or conservation **other than that previously mentioned**?

Name: _____ Location: _____ Stake: _____

Stakeholder ID: _____

Snowball sample

In this part we will ask you about other stakeholders you are aware of. Stakeholders include organisations and individuals who affect or are affected by the management or conservation of either wolves or boar. Their stake is the thing connecting them to management or conservation. At the end of the interview, we will ask if you can put us in contact with these people. We will only use the information you provide about others if they also agree to participate in the interviews.

4. Please write in the table below as many **stakeholders and their roles** as you can. Refer to the previous sections for examples of **sectors** that they may have missed.

Cooperation

- 5a. Which of these stakeholders have you **interacted with** in the context of wolf or boar management?

E.g., by cooperating or working together to achieve something, or someone you have met with because of a problem. These can be positive or negative interactions.

- 5b. **What** have you worked together on? *E.g., the name of a project, or a problem you tried to solve.*

- 5c. Please explain **how** you worked together in each case. Was it on the **level** of administrative programs and policies, or functional “on the ground” actions (‘A’ or ‘F’)?

E.g., Cooperating in lobbying environmental policy, by sharing information and co-organizing events (administrative).

- 5d. In each case, what are the **main reasons** for you choosing to work together with this person?

- 5e. If values or beliefs are the main reason, please shortly explain why:

- 5f. Please score the strength of each of these cooperative relationships as **good, okay, or bad**.

- 5g. Can you put us in **contact** with the other stakeholders you identified?

6. Do you or your organisation have any **opponents**? Please explain.

History, beliefs, and cooperation in conservation

4. All stakeholders	5b+c. Interactions: what & how. Try for specific people or organisations	5d. Reasons - shared goal/ understanding/values, part of role, loyalty...	5f. Score	5g. Contacts names, numbers
1				
2				
3				
4				
5				
6				
7				
8				
9				

Stakeholder ID: _____

III Values, beliefs, and historical context (~30 mins, 2 mins per question)

Now we will ask you some questions about you or your organisation's beliefs regarding the management or conservation of wolves and boar. After that we would like to hear your thoughts on how the items we have spoken about may have changed over the past 30 years. We would like to record this part, as it is in the form of a flowing conversation and we want to be able to return to things that come up later in our research. The recordings will not be shared with anyone or used for any other purposes. Your data will be kept anonymous, and you will not be identifiable from any outputs of the research.

Is it okay with you if we record this part of the interview? Yes No

The respondent should answer the following questions from the perspective of their organisation where possible, but for most they will need to be answered from their own perspective.. There are spaces below the questions to insert quick notes during the conversations.

The key deliverable needed from questions 7 - 12 is the 'why' explanation for each answer given. This will help us to infer beliefs, narratives, and discourses.

Management and conservation beliefs

7a. Do you think wolves or wild boar are a problem in the area? Please explain why or why not.
 Wolves Wild boar Both Neither (**skip 7, answer all 8+9**)

7b. What do you think needs to be done about the problems you mention? Please explain why.

7c. Follow-up: How should these solutions or policies be organised and implemented?

7d. Follow-up: Are these things being done? Please explain why or why not.

Stakeholder ID: _____

Cooperation beliefs

8a. Follow-up: Who do you think should be involved in the management or conservation of wolves and boar? Please explain why.

8b. Follow-up: Do you think more or less government regulation is needed? Please explain why.

- More Less No change

Only if 7a-d is not answered: wildlife beliefs

9a. Do you think that wildlife should be used to benefit humans?

9b. What kinds of policy and approaches for wildlife management are most effective and why?

History and change

For the researcher: we are interested in how participants think local values, beliefs, and collaboration regarding wildlife management (and specifically wolf and wild boar) may have changed since the fall of communism in 1989. If this isn't explicitly referenced, you can then ask about it. Unless otherwise stated, these questions are to be answered from the individual's perspective.

10. Has cooperation like that we discussed earlier changed in this context over the last 30 years? Please explain how it has(n't) changed, and why you think that is.

Stakeholder ID: _____

11. Have local beliefs like those we discussed earlier changed in this context over the last 30 years? Please explain how it has(n't) changed, and why you think that is.

12a. Can you explain what has contributed most to shaping you or your organisation's ideas as expressed in this interview?

12b. How have these ideas have changed over the last 30 years?

12c. Follow-up: how do you think historical context has played a part in shaping these ideas?

IV Future research cooperation with stakeholders:

The final questions are about your general willingness to participate in the research project in the future. Starting in early summer, we would like to conduct more in-depth interviews with different stakeholders about wildlife management and human-wildlife interactions.

a. Would you be interested to cooperate with us in the future on this research project?

No Yes, if yes which of following applies

b. May we contact you for follow-up interviews? No Yes

c. How can we best contact you?

By email: _____ By phone: _____

d. Can we contact you in English? No Yes

e. Do you have any other comments regarding participation?

f. Would you like to receive project updates by email: No Yes, email: _____

History, beliefs, and cooperation in conservation

Appendix 3 Freeman betweenness centrality analysis.

Bridging stakeholders	Betweenness (%)	nBetweenness (%)
<i>Conservation 2</i>	66	31
<i>PLA 1</i>	47	22
<i>PLA 2</i>	42	20
<i>Conservation 4</i>	28	13
<i>Local govt. 1</i>	20	10
<i>Gamekeeper 1</i>	19	9
<i>Consultancy 1</i>	10	5
<i>Local govt. 3</i>	9	4
<i>Conservation 3</i>	3	1
<i>Conservation 1</i>	3	1
<i>Forestry 2</i>	2	1
<i>Local govt. 2</i>	2	1
<i>Consultancy 2</i>	1	1
<i>Farm 3</i>	1	0
<i>Farm 2</i>	0	0
<i>Gamekeeper 3</i>	0	0
<i>Farm 4</i>	0	0
<i>Forestry 1</i>	0	0
<i>Gamekeeper 2</i>	0	0
<i>Tourism</i>	0	0
<i>Farm 1</i>	0	0
Statistical descriptors		
<i>Mean</i>	11.818	5.628
<i>Std. Dev.</i>	17.869	8.509
<i>Sum</i>	260.000	123.810
<i>Variance</i>	319.296	72.403
<i>Min</i>	0.000	0.000
<i>Max</i>	65.667	31.270

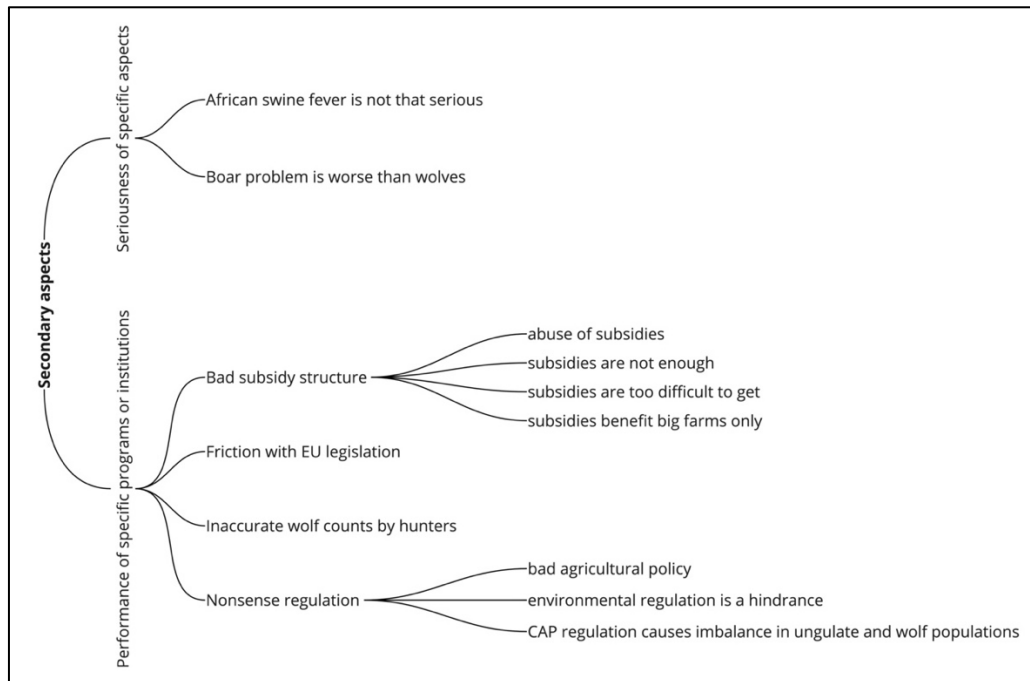
Appendix 4 Clustering optimisation.

The user needs to set the number of clusters for the tool to search for, and so a range of numbers from 2-9 were tested for the stakeholder network.

Clusters:	2	3	4	5	6	7	8	9
R ²	0.145	0.220	0.298	0.359	0.415	0.460	0.505	0.530
Fit	0.619	0.531	0.454	0.401	0.356	0.322	0.289	0.272
a.	Cons. 3, PLA 2, Cons. 2, Cons. 1, PLA 1, Farm 2, Local govt. 2, Local govt. 1, Consult. 2, Forestry 2, Cons. 4, Gamekeeper 2, Tourism	Cons. 3, PLA 2, Cons. 2, Cons. 1, PLA 1, Farm 2, Local govt. 2, Local govt. 1, Consult. 2, Forestry 2, Cons. 4	Farm 2, Forestry 1, Local govt. 1, Local govt. 2	Farm 2, Forestry 1, Local govt. 1, Local govt. 2	Gamekeeper 1, Farm 4, Gamekeeper 3	Gamekeeper 1, Farm 4	Gamekeeper 1, Farm 4	Gamekeeper 1, Farm 4
b.	Farm 4, Farm 3, Consult. 1, Gamekeeper 1, Local govt. 3, Gamekeeper 3, Forestry 1, Farm 1	Farm 4, Farm 3, Consult. 1, Gamekeeper 1, Local govt. 3	PLA 1, PLA 2, Cons. 3, Cons. 2, Consult. 2, Gamekeeper 2, Cons. 4	PLA 1, PLA 2, Cons. 3, Cons. 2, Consult. 2, Gamekeeper 2, Cons. 4	PLA 1, PLA 2, Cons. 3, Cons. 2, Consult. 2, Cons. 4	PLA 1, PLA 2, Cons. 3, Cons. 2, Consult. 2, Cons. 4	Consult. 2, Gamekeeper 2	PLA 1, PLA 2, Cons. 3, Cons. 2, Cons. 4
c.		Gamekeeper 3, Forestry 1, Gamekeeper 2, Tourism, Farm 1	Gamekeeper 1, Cons. 1, Farm 4, Forestry 2, Tourism	Cons. 1, Forestry 2, Tourism, Farm 1	Cons. 1, Forestry 2, Tourism	Cons. 1, Forestry 2, Tourism	Local govt. 3, Gamekeeper 3	Consult. 1, Farm 3
d.			Local govt. 3, Gamekeeper 3, Consult. 1, Farm 3, Farm 1.	Local govt. 3, Consult. 1, Farm 3	Local govt. 3, Consult. 1, Farm 3	Local govt. 3, Consult. 1, Farm 3	PLA 1, PLA 2, Cons. 3, Cons. 2, Cons. 4	Gamekeeper 2
e.				Gamekeeper 1, Farm 4, Gamekeeper 3	Forestry 1, Gamekeeper 2, Farm 1	Forestry 1, Gamekeeper 2	Consult. 1, Farm 3	Farm 2, Local govt. 2
f.					Farm 2, Local govt. 1, Local govt. 2	Farm 2, Local govt. 1, Local govt. 2	Forestry 1, Farm 1	Local govt. 3, Tourism
g.						Gamekeeper 3, Farm 1	Farm 2, Local govt. 1, Local govt. 2	Cons. 1, Forestry 2
h.							Cons. 1, Forestry 2, Tourism	Forestry 1, Consult. 2, Local govt. 1
i.								Farm 1, Gamekeeper 3

Belief code books and hierarchies

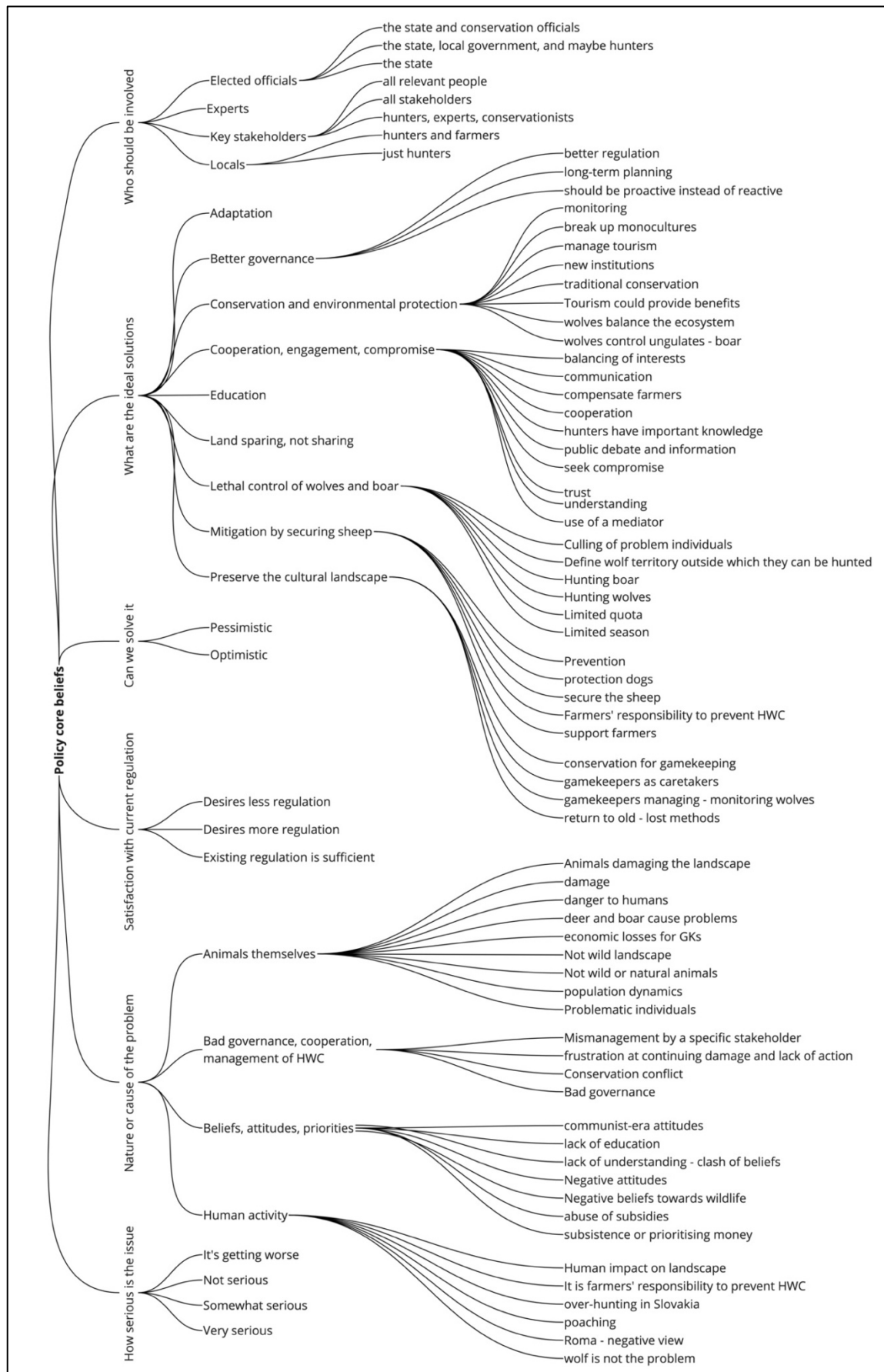
Appendix 5 Secondary aspects hierarchy.



Appendix 6 Secondary aspects codebook.

Belief	Stakeholders	References
Secondary aspects	17	62
Performance of specific programs or institutions	17	60
Bad subsidy structure	11	31
abuse of subsidies	2	2
subsidies are not enough	1	1
subsidies are too difficult to get	9	14
subsidies benefit big farms only	5	6
Friction with EU legislation	3	3
Inaccurate wolf counts by hunters	3	4
Nonsense regulation	8	22
bad agricultural policy	4	8
environmental regulation is a hindrance	1	1
nonsense CAP regulation causes imbalance in ungulate and wolf populations	1	1
Seriousness of specific aspects	2	2
African swine fever is not that serious	1	1
boar problem is worse than wolves	1	1

Appendix 7 Policy core belief hierarchy.



Appendix 8 Policy core belief codebook

Belief	Stakeholders	References
Policy core beliefs	21	680
Can we solve it?	11	18
Optimistic	6	6
solutions are working	1	1
Pessimistic	5	12
What are the ideal solutions?	20	217
Adaptation	4	5
Better governance	5	7
better regulation	2	2
long-term planning	2	3
should be proactive instead of reactive	2	2
Conservation and environmental protection	18	45
monitoring	6	11
break up monocultures	4	5
manage tourism	1	2
new institutions	1	1
Straightforward conservation	8	17
need for environmental protection	2	2
No hunting	1	1
protected reserves	1	1
protection	1	2
greater protection	3	4
national park status	2	3
stricter regulation	3	3
Tourism could provide benefits	3	3
wolves balance the ecosystem	1	1
wolves control ungulates - boar	5	5
Cooperation, engagement, compromise	13	41
balancing of interests	3	4
communication and cooperation	3	6
compensate farmers	4	6
cooperation	4	9
hunters have important knowledge	2	3
public debate and information	1	1
seek compromise	3	5
trust	1	3
understanding	2	2
use of a mediator	1	1
Education	6	12
Land sparing, not sharing	3	3

History, beliefs, and cooperation in conservation

Belief	Stakeholders	References
Lethal control of wolves and boar	11	32
Culling of problem individuals	3	5
Define wolf territory outside which they can be hunted	2	4
Hunting boar	6	12
Hunting wolves	3	4
Limited quota	1	2
Limited season	0	0
Mitigation by securing sheep	13	45
Prevention	1	1
protection dogs	4	6
secure the sheep	3	5
keep sheep inside at night	1	1
Securing sheep naturally controls wolf population	2	3
Farmers' responsibility to prevent HWC	5	6
unsecured sheep	1	1
responsibility of farmers	2	3
undocumented sheep	1	1
unregistered farms	1	1
support farmers	11	16
Preserve the cultural landscape	12	27
conservation for gamekeeping	1	1
gamekeepers as caretakers	1	1
gamekeepers managing - monitoring wolves	3	3
return to old or lost methods	4	6
Who should be involved in solutions?	15	23
Elected officials	7	8
just state + conservation officials	4	5
state, local government, maybe hunters	2	2
the state	1	1
Experts	3	3
experts only	3	3
Key stakeholders	7	8
all people	1	1
all stakeholders	4	5
hunters and experts - conservationists	2	2
Locals or public	3	4
hunters and farmers	2	2
just hunters	1	2
Satisfaction with current regulation	10	10
Desires less regulation	2	2
Desires more regulation	4	4
Existing regulation is sufficient	4	4

History, beliefs, and cooperation in conservation

Belief	Stakeholders	References
Seriousness of the issue	17	29
It is or has been getting worse	3	3
Not serious	12	15
Somewhat serious	3	3
Very serious	5	8
The nature or cause(s) of the problem	21	383
Animals themselves	19	78
Animals damaging the landscape	2	2
boar are a cause of declining traditional game	1	1
wolves causing abandonment	1	1
damage	9	12
danger to humans	2	3
deer and boar cause problems	1	2
economic losses for GKs	4	4
Not wild landscape	4	9
densely populated land	1	1
Not wild or natural animals	9	20
Wolf dog hybrids	3	3
wolves no longer timid	3	4
population dynamics	10	22
overpopulated	10	20
Problematic individuals	2	4
Bad governance, cooperation, management of HWC	21	195
Bad governance	12	39
corruption	1	1
divided responsibilities	5	8
lack of funding	4	7
SK conservation is underfunded	1	2
no faith in government	1	1
uncertainty about wolf population	5	10
Bad legislation and policy	16	60
no support for farmers	3	3
lack of support for HWC	1	1
bad subsidy structure	11	29
subsidies are not enough	1	1
subsidies are too difficult to get	9	14
subsidies benefit big farms only	5	6
friction with EU legislation	3	3
Nonsense regulation	8	22
bad agricultural policy	4	8
environmental regulation is a hindrance	1	1
nonsense CAP regulation causes imbalance in ungulate and wolf populations	1	1

History, beliefs, and cooperation in conservation

Belief	Stakeholders	References
forced legislation	2	3
Conservation conflict	7	25
bad communication	5	10
human conflicts are the problem	1	4
Lack of balance	2	5
lack of cooperation	2	4
no compromise	2	2
frustration at continuing damage and lack of action	2	2
Mismanagement by a specific stakeholder	16	69
bad conservation management	7	28
Lack of scientific rigour in wolf conservation	1	2
SK conservation is under-resourced	1	4
uncertainty in conservation management	1	3
bad forestry management	2	3
forestry monocultures lead to boar damage	1	2
bad hunting management	14	31
hunters cannot cope with boar	1	1
inaccurate wolf counts by hunters	3	5
bad slovakian management	3	7
Beliefs, attitudes, priorities	12	28
communist-era attitudes	1	2
lack of education	2	2
lack of understanding - clash of beliefs	3	6
different understandings of conservation	1	1
Negative attitudes	2	4
Negative beliefs towards wildlife	3	3
negative attitudes towards boar	1	1
negative attitudes towards wolves	1	1
wolves negatively framed or blamed	1	1
abuse of subsidies	2	2
subsistence or prioritising money	4	9
Human activity	20	82
Human impact on landscape	15	53
boar damage from unkept farms	1	1
boar damage from unkept landscape	1	2
problem - development	13	40
accessibility	5	8
infrastructure blocking migration corridors	1	2
Tourism (problem)	8	11
industrial agriculture	5	8
agri practices cause ungulate overpopulation	1	1
monocultures	4	6

History, beliefs, and cooperation in conservation

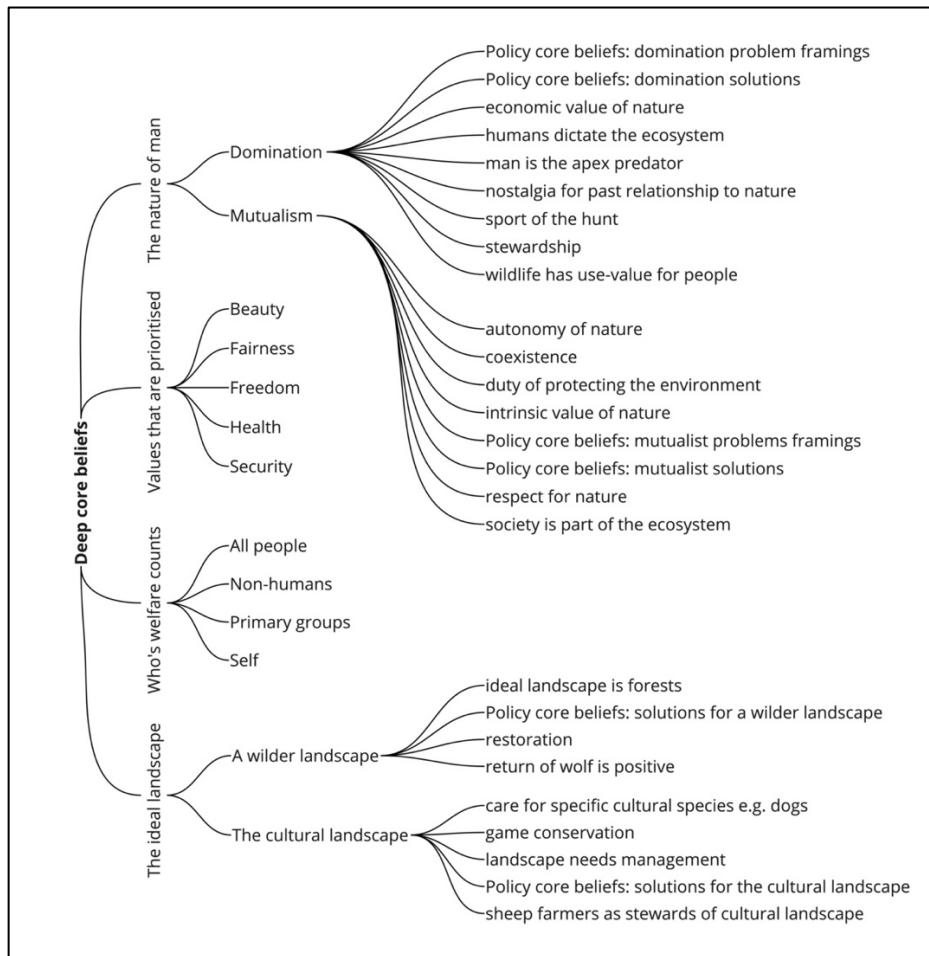
Belief	Stakeholders	References
species loss	2	2
It is farmers' responsibility to prevent HWC	5	6
unsecured sheep	1	1
responsibility of farmers	2	3
undocumented sheep	1	1
unregistered farms	1	1
over-hunting in Slovakia	1	1
poaching	9	16
hunters are stopping wolves returning	1	1
the wolf won't be let repopulate	1	1
Roma - negative view	1	2
wolf is not the problem	2	2

Appendix 9 Aggregation of policy core beliefs to deep core beliefs.

The policy core beliefs in the left columns were aggregated as child codes into the deep core beliefs on the right. The reasons for aggregation are given in the far right column.

<i>Policy core theme</i>	<i>Policy core belief</i>	<i>Deep core theme</i>	<i>Deep core belief</i>	<i>Explanation</i>
The nature or causes of the problem	The problem is the animals	The nature of man	Domination	Framing animals as the cause of the problem suggests a domination-type core belief.
	The problem is humans or their activity		Mutualism	Framing humans as the cause of the problem suggests a mutualism-type core belief.
The ideal solution	The solution is the lethal control of wildlife	The ideal landscape	Domination	Follows from each stakeholders' problem framing, again suggestive of domination or mutualist-type beliefs.
	The solution is the protection of wildlife; tackling poaching		Mutualism	
	The solution is to support sheep farmers; mitigate damages; gamekeepers as caretakers of the landscape		The cultural landscape	Different solutions often implied the preservation of one of two ideal landscapes.
	The solution is ecological reserves; more nature; national park status; reduced human presence		A wilder landscape	

Appendix 10 Deep core belief hierarchy.



Appendix 11 Deep core belief codebook.

Belief	Stakeholders	References
Deep core beliefs	20	494
The ideal landscape	20	153
A wilder landscape	13	36
ideal landscape - forests	1	3
PCBs - solutions	12	26
need for environmental protection	2	2
protected reserves	1	1
break up monocultures	4	5
greater protection	3	4
manage tourism	1	2
national park status	2	3
stricter regulation	3	3
wolves balance the ecosystem	1	1
wolves control ungulates - boar	5	5
restoration	1	1
return of wolf is positive	5	5

History, beliefs, and cooperation in conservation

Belief	Stakeholders	References
The cultural landscape	20	117
care for specific species (dogs,...)	1	1
game conservation	2	3
landscape needs management	2	3
PCBs - solutions	20	106
compensate farmers	4	6
Culling of problem individuals	3	5
Mitigation by securing sheep	13	45
Prevention	1	1
protection dogs	4	6
secure the sheep	3	5
keep sheep inside at night	1	1
Securing sheep naturally controls wolf population	2	3
Farmers' responsibility to prevent HWC	5	6
unsecured sheep	1	1
responsibility of farmers	2	3
undocumented sheep	1	1
unregistered farms	1	1
support farmers	11	16
Preserve the cultural landscape	12	27
conservation for gamekeeping	1	1
gamekeepers as caretakers	1	1
gamekeepers managing - monitoring wolves	3	3
return to old or lost methods	4	6
break up monocultures	4	5
manage tourism	1	2
support farmers	11	16
sheep farmers as stewards of cultural landscape	3	4
The nature of man	20	336
Domination	16	115
Domination core beliefs	5	11
Domination PCBs - problems	14	40
Animals damaging the landscape	2	2
boar are a cause of declining traditional game	1	1
wolves causing abandonment	1	1
danger to humans	2	3
deer and boar cause problems	1	2
economic losses for GKs	4	4
Not wild landscape	4	9
densely populated land	1	1
Not wild or natural animals	9	20
Wolf dog hybrids	3	3

History, beliefs, and cooperation in conservation

Belief	Stakeholders	References
wolves no longer timid	3	4
Domination PCBs - solutions	12	30
conservation for gamekeeping	1	1
Define wolf territory outside which they can be hunted	2	4
gamekeepers as caretakers	1	1
gamekeepers managing - monitoring wolves	3	3
Hunting boar	6	12
Hunting wolves	3	4
Land sparing, not sharing	3	3
Limited quota	1	2
Limited season	0	0
economic value of nature	9	16
Economic value of animals	8	15
humans dictate the ecosystem	3	3
man is the apex predator	2	3
nostalgia for past relationship to nature	1	1
sport of the hunt	5	6
boar are intelligent	1	1
stewardship	4	4
wildlife can be used by people	1	1
Mutualism	20	220
autonomy of nature	3	5
coexistence	3	4
duty of protecting the environment	2	2
individual responsibility to environment	1	1
intrinsic value of nature	8	11
Mutualist PCBs - problems	20	88
boar damage from unkept farms	1	1
boar damage from unkept landscape	1	2
hunters are stopping wolves returning	1	1
negative attitudes towards boar	1	1
negative attitudes towards wolves	1	1
problem - development	13	40
accessibility	5	8
problem - infrastructure blocking migration corridors	1	2
Tourism (problem)	8	11
problem - industrial agriculture	5	8
agri practices cause ungulate overpopulation	1	1
monocultures	4	6
problem - unsecured sheep	1	1
responsibility of farmers	2	3
species loss	2	2

History, beliefs, and cooperation in conservation

Belief	Stakeholders	References
the wolf won't be let repopulate	1	1
undocumented sheep	1	1
unregistered farms	1	1
wolves negatively framed - blamed	1	1
Mutualist PCBs - solutions	19	85
Adaptation	4	5
compensate farmers	4	6
Education	6	12
keep sheep inside at night	1	1
Prevention	1	1
protection dogs	4	6
secure the sheep	1	2
keep sheep inside at night	1	1
solution - break up monocultures	4	5
Solution - Farmers' responsibility to prevent HWC	5	6
problem - unsecured sheep	1	1
responsibility of farmers	2	3
undocumented sheep	1	1
unregistered farms	1	1
solution - manage tourism	1	2
Straightforward conservation	8	17
need for environmental protection	2	2
No hunting	1	1
protected reserves	1	1
protection	1	2
solution - greater protection	3	4
solution - national park status	2	3
stricter regulation	3	3
support farmers	11	16
wolves balance the ecosystem	1	1
wolves control ungulates - boar	5	5
respect for nature	12	23
wolves are intelligent	4	4
wolves are natural	10	16
society is part of the ecosystem	1	1
Values that are prioritised	2	2
Beauty	1	1
Fairness	1	1
Freedom	0	0
Health	0	0
Security	0	0
Who's welfare counts	3	3

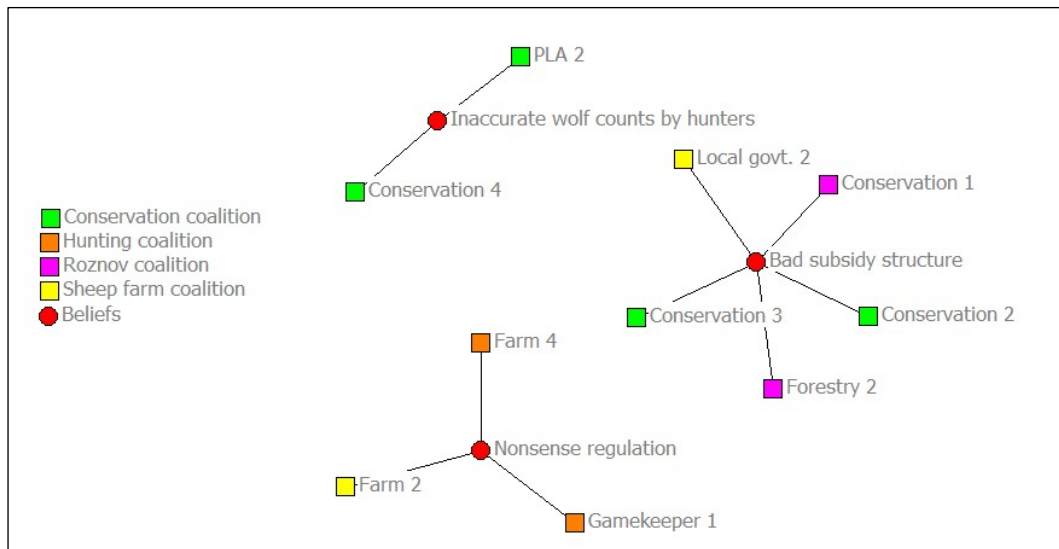
History, beliefs, and cooperation in conservation

Belief	Stakeholders	References
All people	1	1
Non-humans	1	1
Primary groups	1	1
Self	0	0

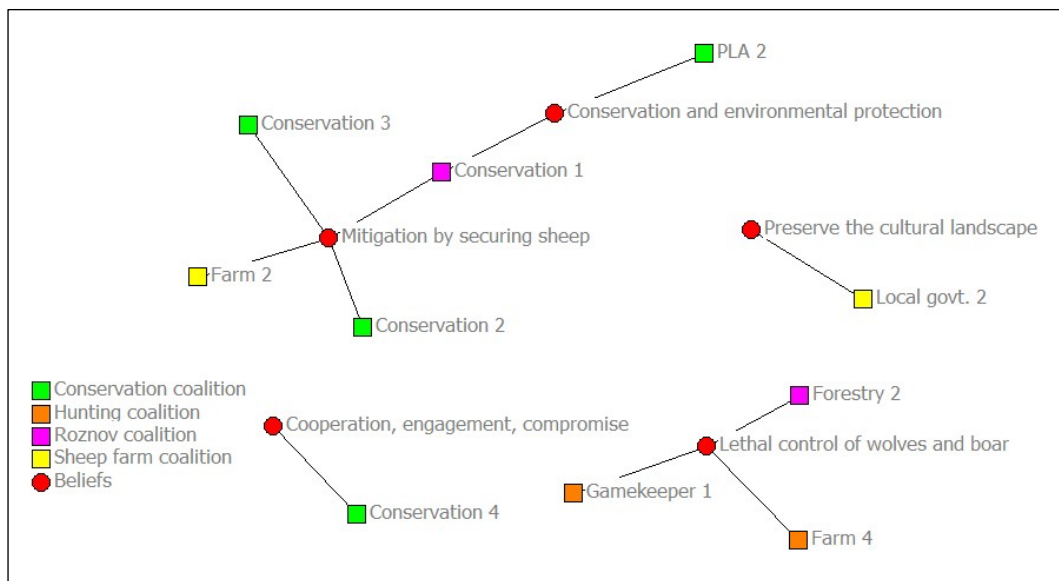
Belief coalition graphs

Appendix 12 Coalitions and secondary aspects.

The secondary aspects are beliefs regarding the performance of specific programs and institutions.



Appendix 13 Coalitions and policy core beliefs regarding ideal solutions.



Narrative code book and hierarchy

Appendix 14 Historical narrative codebook.

These narratives were mostly coded from stakeholders' descriptions of changes in the past 30 years, or differences between the past and present.

Belief	Stakeholders	References
Historical narratives	21	181
Attitudes and cooperation	18	56
Changing beliefs and attitudes towards wolf conservation and boar management	17	42
Attitudes have changed	9	15
Attitudes have not changed	1	1
Attitudes towards boar have reversed	1	1
Improving responses to wolves	5	9
Decreasing contact with nature associated with more acceptance of wolves	1	1
Improving understanding and tolerance of wolves	5	6
More positive framing and discourse of wolves	1	1
The young are more accepting of wolves (maybe education)	1	1
Increasing negative view of gamekeepers	3	3
Locals have forgotten how to coexist with wolves	2	4
Negative attitudes towards wolf conservation have not changed in SK	3	4
Sustainable development	4	5
Changing cooperation	9	14
Changing cooperation due to changing landscape	2	2
Cooperation has deteriorated	4	5
Cooperation has deteriorated	3	3
People are more alienated from one another	2	2
Cooperation has improved	5	7
change - conservationists engaging with stakeholders	2	2
change - cooperation has improved	2	2
change - improving cooperation	3	3
History has little influence	6	7
History has had no influence	1	1
History has no influence because wolves are only a recent issue	2	2
Nothing or very little has changed	3	4
Institutional developments	15	64
Gamekeepers are ageing or declining	2	4
Institutions, policy, regulation	14	43
Agri and forestry regulation	6	8
Changing agricultural policy	2	2
Forestry policy has remained constant	1	1
The restitution process	3	5
Land tenure in svrcinovec was restored	1	2
Changing government institutions	6	11

History, beliefs, and cooperation in conservation

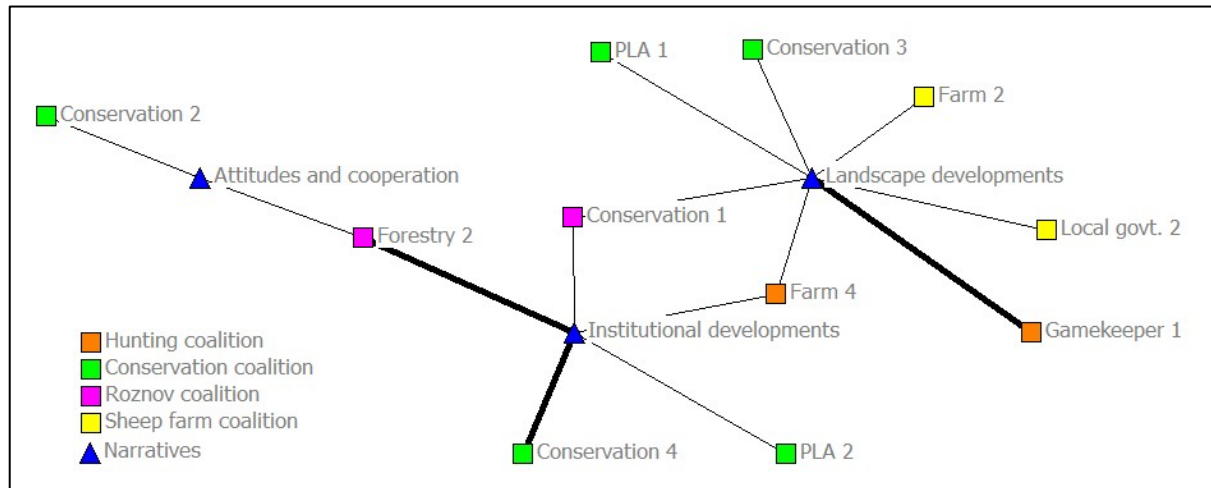
Belief	Stakeholders	References
Environmental and hunting regulation	9	18
Changing environmental regulation	4	7
Changing hunting regulation	5	7
Improving wildlife population estimates	2	3
Stronger protection for wolves	1	1
EU accession or intervention	2	4
Issues with communism versus with the EU	1	1
Only legislation has the power to influence change	1	1
Legacies of the Revolution	7	13
Communism permanently altered the landscape	1	1
Difficulties of the communist system	1	1
Issues with communism versus with the EU	1	1
Land tenure in svrcinovec was restored	1	2
Significant change after revolution	2	2
Socio-economic effects of marketisation	1	1
The restitution process	2	3
The velvet revolution	2	2
Process of modernisation	3	4
Capitalist values, importance of money	2	2
Landscape developments	17	54
Animal populations have changed	9	14
Escalation of conflict with wolves	1	1
Increasing damage from boar	1	1
Changes in human activities and land-use	13	27
Beginning to move away from forest monocultures	2	2
Changes in land-use	5	7
Communism permanently altered the landscape	1	1
Creation of migration corridors	1	1
Depopulation and afforestation	1	2
Forestry is adapting to increased traffic	1	1
Gamekeeping has remained constant	1	1
Greatest change has been in agricultural practices	1	1
Hunting practices have changed	1	1
Increasing land development	4	6
Increasing tourism	4	4
The landscape has changed	8	13
Changing cooperation due to changing landscape	2	2
Forest cover	4	5
Afforestation	1	1
Deforestation followed by afforestation	2	2
Depopulation associated with afforestation	1	2
Parts of the ecosystem are regenerating	1	1

Belief	Stakeholders	References
The changing environment	1	1

Narrative coalition graphs

Appendix 15 Coalitions and alternate narrative categories.

These narratives give slightly different results to those using the nine narratives. The Czech and Slovak parts of the conservation coalition were separated again by focussing on landscape and institutions respectively. The Roznov coalition bridged the three narratives and therefore also the other coalitions.



Appendix 16 Network of coalitions, historical narratives, and beliefs.

