

The Future of Human-Carnivore Coexistence in Europe
- Pathways to Coexistence Between Wolves and Rural Communities in Spain

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Submitted in accordance with the requirements for the degree of
Doctor of Philosophy

The University of Leeds
Sustainable Research Institute (SRI)
School of Earth & Environment

October 2022

The candidate confirms that the work submitted is his/her own, except where work which has formed part of jointly-authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

The work in Chapter two of the thesis has appeared in the following publication:

Pettersson HL, Quinn CH, Holmes G, Sait SM. (2021). "They Belong Here": Understanding the Conditions of Human-wolf Coexistence in North-western Spain. *Conservation and Society*. (1-11). doi:10.4103/cs.cs

The work in Chapter three of the thesis has appeared in the following publication:

Pettersson HL, Quinn CH, Holmes G, Sait SM, Lopez-Bao JV. (2021). Welcoming Wolves? Governing the Return of Large Carnivores in Traditional Pastoral Landscapes. *Frontiers in Conservation Science*. (2:710218). doi:10.3389/fcosc.2021.710218

The work in Chapter four of the thesis has been submitted to the Journal *Geoforum* and is, at the time of writing, awaiting a response:

Pettersson HL, Quinn CH, Holmes G, Sait SM, Blanco JC. (in progress). Who must adapt to whom? Contested discourses on human-wolf coexistence in Spain and their impact on policy.

All of these articles originate from the candidate's (Hanna Pettersson's) PhD research. She was responsible for the conception, study design, data collection, data analysis, drafting of manuscript, and visualization. The articles were co-authored with her supervisors, who provided conceptual feedback and assisted with the review and edits of the manuscripts, as well as Spanish collaborators (chapter three and four), who provided expertise on the national context, contributed data, and provided detailed comments on the manuscripts.

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Rationale for thesis by alternative format

The thesis is presented in an alternative format for three key reasons:

1) It responds to calls for more research on neutral and functional human-wildlife interactions. In order to increase understanding of this under-researched topic and to maximize the impact of the work, it was important to publish findings whilst the project was in progress rather than disseminating findings after submission of a full manuscript.

2) Research on human-wildlife interactions is a rapidly changing field, and its outcomes serve as important policy inputs to support programmes and interventions from the local to the international scale. Timely analysis and dissemination of results was therefore crucial to ensure policy relevance of the research.

3) Research within this thesis is interdisciplinary and concerns complex adaptive systems. It drew on various research areas and theories to produce a theoretical framework. It was important to publish and share this framework with diverse academic audiences in order to validate its applicability and inform the ensuing chapters of the thesis.

The thesis consists of an introductory chapter which sets out the context, rationale and aims of for the research, outlines its overarching strategy, methodology and theoretical underpinnings, and which details the data collection and case study selection approach. The three empirical chapters are comprised of the academic articles listed above, addressing each of the research objectives in turn. The results chapters are followed by a concluding chapter which brings together the general findings of the research. It outlines the overarching insights from the three articles in relation to the objectives, highlights challenges for equitable and durable coexistence governance and outlines the conceptual and empirical contributions of the thesis. This chapter also reflects on the research approach, challenges and limitations of the thesis and possible future research directions.

Acknowledgements

This research project has been a wild, wonderful and rewarding experience thanks to a number of people and institutions, to which I would like to extend my sincere gratitude:

Firstly, to George Holmes, Claire Quinn and Steven Sait, whose supervision, guidance and relentless trimming of my flowery (and voluminous) prose have shaped me into a researcher and the project into research. This was fun, thanks for sharing the ride!

To colleagues at SRI (especially Max, Marta, Laura, Imogen and Zubaida, and the “Conservation and Sarcasm” group) for the liberal sharing of knowledge, mishaps and successes, as well as tea-breaks and pub visits throughout these four years.

To NERC, the Leeds-York DTP, ESRC IAA (through LSSI) and Helge Ax:on Johnson Foundation for funding the project, and to SRI for providing additional support for conferences and dissemination.

To the Spanish crew: the locals and informants who made the research possible, Entretantos/GCG (especially Maria, Yolanda and Julio) and Fuencis for invaluable facilitation; Juan Carlos Blanco and José Vicente López Bao for their expertise and collaboration; Barbara Martí Domken and Vicente Palacios for so much, including surreptitious wolf-watching and dog-walking during the first covid lock-down, and to Ana and family in Garganta for keeping me fed and (more or less) sane during the second. Thanks also to Emma and Robert for the mountain adventures, and to Noelia for showing up as a kindred spirit and a friend when I most needed one.

To Juliette Young and the Alternet summer school family for a final boost of energy and inspiration during the last weeks of my PhD.

And lastly, to my wonderful family and friends for cheering me on, but also for persistently luring me away from my desk, thus enriching my life and work throughout these four years. Especially Yo, for Canada and for last-minute proofing, and to Smashleigh, for celebrating submission in style with me.

Abstract

Large carnivore populations are expanding across Europe, while popular support for the process continues to grow. This development has been hailed as a hopeful sign for wildlife recovery, aligning with the ambition of the UN 2030 Framework to be “living in harmony with nature by 2050”. However, reintegrating carnivores in multi-use landscapes is challenging, especially where there are disagreements about their belonging, and where costs and benefits of their presence are incurred at different spatial scales. Despite these challenges, few have studied what fosters and perpetuates durable coexistence, or how to work proactively with communities facing the return carnivores. This thesis addresses this gap through a cross-case synthesis of communities at different states of wolf expansion in Spain: one known for long-established coexistence, one where wolves have returned in recent decades and one where they are expected to return imminently. Adopting a qualitative research design and using a diverse methodological toolkit, the thesis explores the social and ecological conditions which help or hinder adaptation to wolves within each community. Each of its empirical chapters focuses on a specific element of coexistence: the underpinnings of established coexistence; the lessons about adaptive needs and capacities from each state of wolf presence; and the assumptions and priorities which influence how coexistence is understood and governed.

The thesis demonstrates that functional and neutral relationships have been overlooked by a policy-reality that has remained focussed on addressing conflicts. It also finds that governing institutions in Spain have a retroactive approach to wolf expansion: intervening once wolves have already caused damage and/or social disagreement. It identifies a range of socio-economic vulnerabilities which undermine the willingness and capacity of communities to adapt to wolves, including economic precarity, scrub encroachment and loss of social services. Finally, it identifies power-knowledge hierarchies within Spanish and European conservation institutions which inhibit inclusive governance approaches. These issues perpetuate an institutional focus on disciplining conduct and mitigating wolf impacts, rather than addressing the underlying drivers of conflicts or building on successful initiatives and practices. Through these findings, the thesis advances knowledge on the elements of legitimate and dynamic governance of wildlife recovery in the Anthropocene, and the barriers which prevent just transformation to positive and durable coexistence.

Resumen

Las poblaciones de los grandes carnívoros se están expandiendo por toda Europa, a la par que sigue creciendo el apoyo popular a dicho proceso. Este desarrollo ha sido recibido como una señal esperanzadora en beneficio de la recuperación de la biodiversidad, en línea con el objetivo de la Agenda 2030 de la ONU de "vivir en armonía con la naturaleza antes de 2050". Sin embargo, la reintegración de carnívoros en paisajes antrópicos constituye un desafío, especialmente donde hay desacuerdos respecto a su pertenencia o no al territorio, y donde los costes y beneficios de su presencia ocurren en diferentes niveles. A pesar de estos retos, no se han estudiado suficientemente los factores que fomentan y perpetúan una coexistencia sostenible, ni cómo trabajar de manera proactiva con las comunidades que están enfrentando el regreso de los carnívoros. Esta tesis aborda esta brecha a través de una síntesis de estudios de caso de comunidades que se encuentran en diferentes estados de expansión del lobo en España: uno conocido por una coexistencia establecida desde hace mucho tiempo, uno en el que los lobos han regresado en las últimas décadas y uno donde su reintroducción está anticipada. Adoptando un diseño de investigación cualitativo y utilizando un conjunto de herramientas metodológicas, la tesis explora las condiciones sociales y ecológicas que fomentan o inhiben la capacidad de cada comunidad para coexistir con los lobos. Cada uno de los capítulos empíricos de la tesis se centra en un elemento específico de la coexistencia: las condiciones que han permitido una coexistencia establecida; lo que podemos aprender de las necesidades y capacidades adaptativas de cada estado de presencia del lobo; y los supuestos y prioridades que influyen en cómo la coexistencia es interpretada y gestionada.

La tesis demuestra que las relaciones armoniosas y neutrales han sido ignoradas por unas políticas de conservación que mantienen un enfoque demasiado centrado en el conflicto. También revela que las instituciones gubernamentales en España tienen una aproximación retroactiva a la expansión del lobo: intervienen una vez que los lobos ya han causado daño y/o desacuerdo social. La tesis identifica una serie de vulnerabilidades socioeconómicas que impiden la voluntad y la capacidad de las comunidades para adaptarse al lobo; como, por ejemplo, la precariedad económica, la expansión de matorral o la pérdida de servicios sociales. Finalmente, identifica jerarquías de poder y conocimiento dentro de las instituciones conservacionistas europeas y españolas que inhiben los

procesos de gobernanza inclusiva. Estos problemas perpetúan un enfoque institucional centrado en controlar, aplicar soluciones tecnocráticas y mitigar los impactos del lobo, en lugar de abordar los factores subyacentes a los conflictos o de ampliar las iniciativas y prácticas exitosas. Con estos hallazgos, la tesis avanza en el conocimiento sobre los elementos de gobernanza legítima y dinámica de la recuperación de la vida silvestre en el Antropoceno, así como sobre las barreras que impiden una transformación justa hacia una convivencia positiva y duradera.

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List of acronyms and abbreviations

ACs	Autonomous communities
CAP	Common Agricultural Policy
CyL	Castile and León (Castilla y León)
EU	European Union
GCG	(Observatorio) Grupo Campo Grande
GPA	Asturian government (Gobierno del Principado de Asturias)
HCI	Human-carnivore interactions
HNVF	High nature value farming
HWCCSG	Human-wildlife conflict and coexistence specialist group (formerly the Human wildlife conflict task force, HWCTF)
HWI	Human-wildlife interactions
IUCN	International Union for the Conservation of Nature
LCs	Large carnivores
LGD	Livestock guardian dog
MITECO	Ministry for the Ecological Transition and the Demographic Challenge
NP	National park
PENP	Picos de Europa National Park
SES	Social-ecological systems
SdIC	Sierra de la Culebra
S-LC	Sanabria-La Carballeda

Chapter 1

Introduction, research design and methodology

1.1 Introduction and thesis overview

Conservation science is increasingly moving away from the nature-culture dichotomy and efforts to separate people from nature (i.e. “fortress conservation”) (Pascual et al. 2021, IPBES 2022). In the words of Emma Marris: “thinking of humans and nature as incompatible makes it impossible to revive or discover ways of working with and within nature for the common good” (2021, p 54). According to this line of thinking, conservation should focus on maximising biodiversity in multifunctional landscapes that include human societies, fostering convivial relationships between people and wildlife at different scales (Corlett 2016, Büscher and Fletcher 2019, Pooley 2021). In other words, the future of conservation is about promoting dynamic human-wildlife coexistence. The question then becomes how this can be achieved, particularly when it concerns “problematic” wildlife such as large carnivores (LCs), whose presence can compromise human safety, livelihoods and food security through competition over space and resources (Linnell and Cretois 2018).

The challenge of coexistence is faced by people across the world and is particularly evident in agricultural landscapes, which in Europe cover almost half of the continent's surface (European Union 2018). It is a culturally diverse and densely populated fabric, from which LCs over the last century were largely extirpated. Yet recent decades have seen unprecedented changes in the composition and function of these landscapes, and in how they are viewed and valued by people (Navarro and Pereira 2012, Queiroz et al. 2014, Bürgi et al. 2017). These trends have also influenced how people think about, feel about and govern wildlife. Charismatic species such as wolves (*Canis lupus*), European lynx (*Lynx lynx*) and bears (*Ursus ursus*) have been cast in new roles: from vermin to iconic “ecosystem engineers”, believed capable of restoring “natural equilibrium” to disturbed nature (Mech 2012, Marris 2021, Blossey and Hare 2022). Accordingly, these species are increasingly seen as candidates for reintroduction and assisted migration, also into areas under active human management (Corlett 2016, Malhi et al. 2022).

Coupled with improving habitat conditions for LCs and growing ungulate populations as potential prey, these shifts have enabled LCs to recolonise large parts of the European continent, returning to areas from which they were extirpated decades or even centuries ago (Chapron et al. 2014, Cimatti et al. 2021). This has been hailed as a success for the European conservation approach and proof of concept for human-LC coexistence (Chapron et al. 2014, Mech 2017, Cretois et al. 2021). Upon closer scrutiny, the picture is more multi-faceted. LCs impact socio-ecological systems in various ways, both positive and negative, but these effects are often incurred at disparate spatial and temporal scales (Hanley 2015, Rode et al. 2021). A central conundrum is that the benefits of LCs typically are difficult to measure, slow to reach people and seldom extend to entire communities. Negative impacts on the other hand are often instantaneous and disproportionately experienced by traditional resource users, many of whom are already socially and/or economically vulnerable (McShane et al. 2011, Hovardas et al. 2017, Redpath et al. 2017). Reintegrating LCs into agricultural landscapes has therefore been described as a “wicked problem”: one that can be managed but never be solved (Redpath et al. 2013, Duit and Löf 2018).

One of the principal conservation challenges in the 21st century is therefore how to reconcile the rights and autonomy of wildlife with the growing commitment to social equity and recognition of local and indigenous knowledge, priorities and ways of being in nature (Chapron and López-Bao 2020, Pooley 2021, IPBES 2022). This calls for new ways of thinking about how humans and LCs may share space, and how LCs may be governed to ensure long-term stewardship and mutual adaptation in shared landscapes (Carter and Linnell 2016, Büscher and Fletcher 2019). Yet this transformative shift has been hindered by a lack of empirical knowledge of the socio-ecological conditions that foster harmonious and socially accepted relationships (Pooley et al. 2017, Lozano et al. 2019, Fiasco and Massarella 2022). Such relationships are out there in the world already, in all their diversity (Pooley et al. 2020). Learning from these cases provides an opportunity to expand conservation science with alternative knowledge systems and perspectives, a global priority to ensure equitable and effective protection of the Earth’s interconnected biological and cultural diversity (Pretty et al. 2010, Pascual et al. 2021, IPBES 2022).

This thesis addresses this empirical gap by studying one of the most complex coexistence challenges in the northern hemisphere: the

recolonisation of wolves into pastoral areas. It explores the underpinnings of functional human-wolf interactions in three case study sites in rural Spain: permanent presence, recent return and imminent return of wolves, and analyses how different interpretations of nature and coexistence become adopted or disregarded within national policy. In doing so, the project advances the coexistence literature in the following ways: first, it expands understanding of why some places seem better able than others to coexist with challenging species. Second, it illuminates how coexistence can be proactively fostered at different states of LC recolonisation, according to the idiosyncratic needs and contexts of impacted communities. Third, it reveals epistemological and practical barriers to just and inclusive coexistence policy and illuminates initiatives that are paving the way to better governance approaches.

1.1 Thesis structure

The remainder of this chapter provides the context for the research by delving into the wider academic debate on human-wildlife interactions, shared multi-use landscapes and the interactions between these systems (section 1.2). This section also outlines knowledge gaps and how they are addressed within the thesis. Section 1.3 introduces the Spanish context and the rationale for studying wolves to inform coexistence research. Section 1.4 describes the aims and objectives of the thesis, while section 1.5 outlines the research design and overarching methodological approach, as well as the theoretical and analytical underpinnings. The main body of the thesis consists of three results chapters (two, three and four) which make individual contributions in the form of academic articles. The first two have been published, while the third is submitted awaiting response. Chapter five wraps up the thesis by discussing general findings, contributions and future research directions.

1.2 Research context and rationale

The research presented in this thesis integrates perspectives from various fields, spanning political ecology, human and environmental geography, conservation biology and science and technology studies. This interdisciplinary approach is necessary to understand the social and ecological factors that influence human-carnivore interactions (HCIs) at multiple scales and to advance the cross-sectoral cooperation required to tackle the societal challenge constituted by LC conservation (Bennett et al. 2017, Hartel et al. 2019).

The following sub-sections provide a critical review and synthesis of the key literature and concepts that underpin the thesis. Exploring and incorporating this body of work has been an iterative process throughout the research, as the objectives were expanded or refined, and due to the continuous output of academic papers.

Each sub-section begins by outlining the state of knowledge up until 2019, from which the objectives and research strategy of the thesis were distilled. The research gaps that it seeks to address are highlighted at the end, as well as how each results chapter contributes to recent advances on coexistence and just transformation agendas.

1.2.1 Human-wildlife interactions: From conflict to coexistence

Human-wildlife interactions (HWIs) is a well-researched field, and one which tends to generate significant public interest, especially when it concerns charismatic species such as elephants, wolves, or jaguars (Jepson and Barua 2015). Until recently, it was predominantly focussed on understanding and addressing negative impacts to and from wildlife (such as livestock depredation and crop raiding) and associated human intolerance, usually under the banner of human-wildlife conflicts (see e.g Woodroffe et al. 2005). As phrased by Pooley et al (2017: p. 524), it was a field in which wildlife and people tended to be “studied separately and with different ontologies, epistemologies and methodologies [...] often to protect wildlife rather than humans”. This resulted in a range of technical and economic instruments designed to mitigate these impacts, change attitudes and thereby resolve conflicts, including fencing, environmental education and compensation payments. These were often designed and promoted by natural scientists, targeting specific dissenting communities, such as farmers or hunters, often with limited support for or evaluation of local effectiveness (Bennett et al. 2017, Eklund et al. 2017). Yet even in cases where the instruments reduced

negative impacts, social tensions usually remained, which caused disillusionment with conservation programmes and led researchers to delve deeper into the underlying social and political causes of conflicts. They started to uncover the significance of identity, emotions and worldviews in how people perceive wildlife, leading to an influx of new perspectives and disciplines into the field. This included psychology, anthropology and sociology, and the research focus expanded into unpacking human attitudes and behaviour, and the influence of different governance approaches (Dickman 2010, Bruskotter et al. 2015, Redpath et al. 2015).

These new perspectives contributed to a number of important revelations. Firstly, the importance of differentiating negative wildlife impacts (such as livestock damage) from conflicts between humans over wildlife. These are often rooted in tensions between social groups over the management of natural resources and competing conservation objectives, which a particular species had come to represent (i.e. people-people conflict) (Madden 2004, Young et al. 2010, Redpath et al. 2013). Secondly, that the analytical and practical focus on addressing adverse relations risked projecting an image of them as an inevitable outcome of HWIs, rather than one of multiple possible and simultaneous relationships (Peterson et al. 2010, Pooley et al. 2017). Third, that the predominantly retroactive, ad-hoc approach (i.e., acting only once the conflict had already ensued) prevented the identification, analysis and amplification of functional coexistence. This was a serious problem since it risked neglecting or even disincentivising peaceful relations (Madden 2004, Bennett et al. 2015, Pound 2015).

The revelations have led to a shift in thinking and in policy that considers coexistence alongside conflict, and which acknowledges the whole range factors that influence HWIs. The shift can be exemplified by the work of the EU's Platform on Coexistence between People and Large Carnivores (e.g. Hovardas et al. 2017). It has also led to a new area of research that seeks to understand the factors that foster durable and socially equitable forms of coexistence (Madden and McQuinn 2014, Carter and Linnell 2016, Hovardas and Marsden 2018). Within this literature, coexistence is increasingly described as a state wherein both humans and carnivores are able to pursue their respective interests without substantially compromising the means of the other, and where there is a capacity to continuously manage issues as they arise. This type of coexistence is defined by Carter and Linnell (2016: 575) as a: “[...] dynamic but sustainable state in which humans and large carnivores co-adapt to living in shared landscapes where

human interactions with carnivores are governed by effective institutions that ensure long-term carnivore population persistence, social legitimacy and tolerable levels of risk”, a definition that has been adopted by a number of organisations and institutions (including the IUCN Human-Wildlife Conflict Task Force, HWCTF (2021) – which was re-named The Human-Wildlife Conflict and Coexistence Specialist Group, HWCCTSG in 2022).

Research gap and thesis rationale:

In recent years, significant advances have been made in describing and differentiating positive states of coexistence from those which merely lack expressions of intolerance. This research has focussed on stewardship among local communities and institutions, and how it can be fostered in ways that recognise complexity, plurality and human well-being (Bhatia 2021, Pascual et al. 2021). In the context of HWIs, stewardship implies notions of feelings and actions that emerge from reciprocal relationships between human and non-human life in specific places, encompassing dimensions of care, knowledge and agency (Pooley 2021: p. 4). Yet empirical studies on what underpins stewardship and convivial relationships in multi-use landscapes, and how these relations are influenced by socio-economic trends, have until recently been rare (Pooley et al. 2017, Büscher and Fletcher 2019, Lozano et al. 2019). This research is crucial to building a knowledge base of practices and examples that help those with dysfunctional or immanent HWIs imagine alternative (positive) futures, and to ensure that functional interactions are supported through ongoing transitions (Bennett et al. 2015, 2019, IUCN HWCTF 2021).

This thesis contributes to this emerging strand of scholarship (e.g. Dorresteyjn et al. 2016, Hovardas and Marsden 2018, Marino 2019, Toncheva and Fletcher 2021). Chapter two explores human-wolf coexistence and stewardship in Sanabria-La Carballeda (S-LC), which has one of the highest densities of wolves in Europe. Looking through a coexistence lens and integrating perspectives from the convivial conservation movement (Büscher and Fletcher 2019), it analyses the social-ecological conditions that have enabled this region’s uninterrupted and comparatively harmonious relationship with wolves. The chapter traces the influence of broader political-economic trends on these relationships and illuminates underlying power dynamics and justice concerns that pose a risk to the area's future coexistence capacity.

1.2.2 Where human-carnivore interactions take place: Biocultural perspectives on coexistence landscapes

Human resource use through time not only affects present-day habitats and species distribution, but also the way nature and wildlife are perceived and protected. Perspectives from environmental history and the politics of the rural have therefore become important in understanding the socio-cultural setting of HWIs in a particular place (Higgs et al. 2014, Lambert 2015, Kurashima et al. 2017). Europe's rural landscapes have over millennia been sculpted into a patchwork of crop, pasture and rangelands, wherein specific flora, fauna and human uses have co-evolved, while others disappeared (Renwick et al. 2013, Queiroz et al. 2014, Hinojosa et al. 2018). The outcomes of these interconnected environmental and social processes are captured by the concept *biocultural diversity*. It illuminates the relationships between people and nature in a particular place, and how they form part of local identities, memory and cultural heritage (Pretty et al. 2010, Agnoletti and Rotherham 2015).

People's relationships with nature and resulting landscapes are continuously rearranged by socio-economic processes, which can be illustrated by the demise of the once ubiquitous extensive farming practices across large parts of the continent. Through processes of globalisation and rationalisation, the European Union (EU) has become the single largest importer of agricultural commodities, and European farmers have become exposed to the increasingly competitive and volatile world market (Darnhofer et al. 2010, Von Witzke and Noleppa 2010, Bürgi et al. 2017). Coupled with rising production costs and agricultural subsidies that promote output over environmental performance (Navarro and López-Bao 2018), these shifts have caused parallel processes of agricultural intensification and homogenisation on fertile land, and an exodus of people and their livestock from mountainous, arid and remote areas. This trend, described in the literature as de-agriculturalisation, has transformed many pastoral landscapes into places for leisure and recreation and has led to significant recolonisation of forest and scrub (Kasimis 2010, Renwick et al. 2013, de Almeida 2017).

The changing preferences in how nature is used and viewed have led to radical proposals for nature restoration and reconfigured relationships between people and the landscape. Organisations such as Rewilding Europe are promoting the reintroduction of wild ungulates and carnivores, which combined with ecotourism is intended to restore semi-open and "self-

sustaining" ecosystems and provide economic and other benefits for surrounding communities (Jepson and Shepers 2016). Rural depopulation has from this perspective been approached as an opportunity, both to bring back missing species and natural processes, and for Europe to accept a larger share of the burden of conservation, especially for LCs (Lindsey et al. 2017, Kojola et al. 2018), which hitherto has been disproportionately imposed on poorer countries (Corlett 2016, Bowman et al. 2017).

However, a number of studies have pointed out a discrepancy between potential and actual depopulation, and a troubling overlap between identified restoration hotspots and remaining rural communities that are fighting to maintain their heritage and ways of life (Jørgensen 2014, Knight 2016, Hinojosa et al. 2018). Some of these communities sustain high nature value farmlands (HNVPs), including hay meadows and silvopastoral systems, which make up a significant proportion of Europe's Natura 2000 network, and which are highly valued for recreation (Paracchini et al. 2008, Pretty et al. 2010). These multi-use landscapes represent some of the most bioculturally diverse habitats on the continent, while also supporting livelihoods, providing high-quality nutrition and sequestering carbon (Eichhorn et al. 2006, Scoones 2022). Scholars, as well as policy-makers, have therefore challenged the cultural imagery of *terra nullius* (i.e. vacant landscapes wherein past management practices have become obsolete), and the lack of consideration of the social consequences of abandonment (Queiroz et al. 2014, Butler et al. 2021, Quintas-Soriano et al. 2022). This perspective calls for increased efforts to sustain multi-use landscapes, which often involves supporting free-range grazing of livestock on marginal lands in order to prevent scrub encroachment and wildfires (López-Sánchez et al. 2016, Lasanta et al. 2018, Recio et al. 2020). However, this practice is simultaneously the most challenging with regard to LC coexistence, due to the difficulty of protecting the livestock from predation (Linnell and Cretois 2018, Risvoll and Hovelsrud 2021).

These contradicting perspectives and priorities about the future of Europe's landscapes encapsulate ongoing debates regarding where and how to conserve biodiversity, which components of nature are "natural" and valuable and the place of people and wildlife within (Agnolletti and Rotherham 2015, Corlett 2016, Holmes et al. 2022, Lécuyer et al. 2022). It also offers insight into the intensified polarization of perceptions concerning whether LC restoration is wrong or right and whether they are useful or useless for people (Manfredo et al. 2009, Linnell 2013a).

Research gap and thesis rationale:

Previous research has combined historical landscape and political perspectives with animal geographies to illuminate why certain species are perceived to belong or be out of place (e.g. Skogen and Krange 2003, Dorresteijn et al. 2014, Margulies and Karanth 2018). This work has contributed vital knowledge to a field that has been dominated by natural sciences and quantitative appraisals of attitudes, intolerance and damage mitigation strategies. However, there are few empirical studies on how LC presence influences peoples' sense of place and ideas about how to live a meaningful life in a particular landscape (Lozano et al. 2019, Pooley 2021, Holmes et al. 2022).

This shortfall is addressed in chapter two, where perspectives from environmental history are used to illuminate how human-wolf relationships have developed through time in Sanabria-La Carballada, and how this has affected local views of wolves and their role in the landscape. Chapter three applies a biocultural lens to analyse the interconnections between people, cultures, landscapes and LCs within all three case studies (which are introduced below), and how this shapes local willingness and capacity to coexist. Finally, in chapter five, different interpretations of rural landscapes and human-nature interactions are explored, as well as how these interpretations become manifested in Spanish coexistence policy and the potential impact of these policies on people and wolves. Through this work, the thesis contributes empirical evidence to the emerging body of work on the mutually reinforcing restoration of biological and cultural diversity (Gavin et al. 2018, Iordachescu 2022, Lécuyer et al. 2022).

1.2.3 A systematic approach to studying adaptive needs and capacities

As illuminated by previous sections, the erosion of cultural and biological diversity often shares common drivers, such as the homogenization of landscapes and climate change. LC return thereby represents just one of many interconnected social, political, economic and ecological challenges for rural communities (Henle et al. 2008, Pretty et al. 2010). In the literature, this acknowledgment has highlighted the need for cross-sectoral approaches in the research and governance of HWIs within multi-use landscapes (Young et al. 2010, Hartel et al. 2019). Promoting coexistence between people and wildlife can form part of a broader strategy to enhance sustainability and good environmental governance in rural areas, thereby ensuring socially just alignment to global biodiversity and climate agendas, including the

Sustainable Development Goals and the post-2020 biodiversity framework (Darnhofer et al. 2010, Leach et al. 2010, Whitehouse 2015).

The Social-Ecological System (SES) approach is increasingly adopted to account for the spatial, temporal and organisational processes that influence human and wildlife behaviours in a given place (Mosimane et al. 2014, Sjölander-Lindqvist et al. 2015, Lischka et al. 2018). This is because coexistence is not only determined by HWIs, but also by how human-human interactions impact wildlife and vice versa (Carter and Linnell 2016, Nyhus 2016). By seeing human societies and the ecosystem in which they reside as a co-evolving web of interconnections, the SES approach departs from the tendency to study humans and wildlife separately (Pooley et al. 2017). It has enabled researchers and practitioners to illuminate a more complete picture of relevant components, including predator-prey dynamics and social value systems and the indirect and direct drivers that influence the spatial-temporal overlap and interactions between people and wildlife (Dickman 2010, Lischka et al. 2018, Lozano et al. 2019).

The emphasis on cross-sectoral and interdisciplinary approaches has increased the complexity of coexistence planning and management. Overall, coexistence projects are now expected to contribute to both biological and socio-economic objectives (Adams 2015a, Büscher and Fletcher 2019). However, the aim is not a state where risks and negative impacts from LCs have been eliminated, nor where there is an absence of social disputes. Conceptual advances in the HWI field have led to a rejection of binary interpretations of conflict-coexistence and the notion that conflicts can be resolved (Peterson et al. 2005, Linnell 2013a, Redpath et al. 2015). Disputes are inevitable and moreover useful to identify weaknesses and problems, thereby harnessing momentum for the continuous improvement of a system (Young et al. 2010, Madden and McQuinn 2014, Tindall et al. 2015). The capacity to self-organise and continuously adapt to emerging circumstances are defining features of resilience, a concept that has come to encapsulate the global pursuit to increase the durability and flexibility of earth systems in the face of ongoing socio-ecological transitions (Leach et al. 2007, Nelson et al. 2007). Coexistence landscapes are no exception. This has yielded an increasing focus on understanding what underpins the adaptation and adaptive capacities of both people and LCs (Linnell 2013a, Whitehouse 2015, Pooley et al. 2017).

Adaptation is here defined as “the decision-making process and the set of actions undertaken to maintain the capacity to deal with future change or

perturbations to a social-ecological system without undergoing significant changes in function, structural identity, or feedbacks of that system while maintaining the option to develop” (Nelson et al. 2007: p. 397). For the HWI context, co-adaptation is defined as a process where both people and LCs are able to learn from experience and change their behaviour in relation to each other (Carter and Linnell 2016). LCs have shown a remarkable capacity for adaptation to humanised systems in ways that both mitigate and exacerbate conflicts, such as nocturnal or crepuscular activity patterns and taking advantage of human food sources (Carter and Linnell 2016, Milanese et al. 2017, Reinhardt et al. 2019). In the case of people, coexistence requires both ability (resources and knowledge) and willingness (i.e. tolerance/acceptance) on the part of both impacted communities and governing authorities (Peterson et al. 2005, Carter and Linnell 2016, Gavin et al. 2018).

Research gap and thesis rationale

In light of ongoing demographic transitions in the countryside, and in conjunction with the increasing urgency of climate and biodiversity crises, there is a growing urgency to enhance resilience in rural communities (Bowman et al. 2017, Bürgi et al. 2017, Lécuyer et al. 2022). Yet despite the continuing expansion of LCs, research on how to proactively plan for their return and identify adaptive needs and capacities in particular settings is still at a nascent stage. Moreover, few research projects have consulted the stakeholders in question on how they expect or would like their communities to develop given the challenges they face.

This thesis addresses this gap in chapters three and four. Chapter three introduces a theoretical framework that unpacks and expands the conditions of resilient coexistence, informed by a pathways approach to understanding and building sustainability within a particular system (Leach et al. 2007, 2010, Fazey et al. 2016). The framework is intended to support researchers and practitioners to identify and address socio-economic vulnerabilities beyond those related to explicit LC impacts, and thus to proactively enhance local coexistence capacities. It thereby contributes to the emerging toolbox for transformative governance of HWIs (e.g. Hovardas and Marsden 2018, IUCN HWCTF 2020, Durant et al. 2022), in response to the shift in thinking discussed in section 1.2.1. The framework is applied to field data from the three case study sites to show empirically how the conditions are manifested and interconnected and how this knowledge could be used to enhance local coexistence capacity. Chapter four draws on provisioning elements of the

data to elucidate different coexistence landscapes and the pathways toward them, as imagined by informants and in the public discourse, and how these are reflected (or not) in policy.

1.2.4 Governance of HWIs: Just transitions to coexistence

Conservation is an inherently political endeavour (Holmes 2007, Brockington et al. 2008, Büscher and Fletcher 2020). As the world moves towards post-2020 biodiversity and climate agendas, it has become increasingly evident that global-scale policy initiatives have failed to curb biodiversity loss and conservation conflicts (Gavin et al. 2018, Büscher and Fletcher 2019, Dziba et al. 2019). Part of the rationale for the prolific research on LC conservation is that the topic is symbolic of the causes and consequences of these failures, such as incompatible ontologies of nature, negative livelihood impacts and illicit killing of wildlife and habitat destruction (McShane et al. 2011, Bruskotter et al. 2017, Margulies and Karanth 2018). The presence of LCs within multi-use landscapes strikes at the heart of relationships between conservation, development and justice. Debates about how these realms could or should be integrated within LC governance, how to represent the stakes of wildlife (and by whom) and through which approach (top-down or bottom-up) are still ongoing (e.g. Redpath et al. 2017, Pooley and Redpath 2018, Vucetich et al. 2018). The perceived justice of coexistence policy is important for both moral and instrumental reasons (Lockwood 2010, Decker et al. 2016), and can be summarized in three realms: *distributional*, meaning the distribution of impacts (positive and negative) and responsibilities within given spatialities; *recognition* or *epistemic*, meaning the acknowledgement of the diversity of participants' identities, worldviews, knowledge, rights and needs, as well as respect for pre-existing institutional arrangements; and *procedural*, by which is meant the fairness and legitimacy of institutions, decision-making processes and representation of impacted parties (Walker 2009, Bennett et al. 2019).

The justice framework has enabled political ecologists scholars to elucidate distributional and epistemic injustices of LC conservation, as well as their role in failed conservation interventions, and to question dogmatic truths about wildlife and their impact on particular systems (Lorimer 2015, Jacobsen and Linnell 2016, Gavin et al. 2018). Justice cannot be analysed without understanding its context of power. Dimensions of power shape the discourse on what is considered just and when and where carnivores are out of place. Scholars have furthermore shown how power influences what type of knowledge these judgements can be based upon; what is considered true

and what can be disregarded (Holmes, 2007; Jørgensen, 2014; Rutherford, 2007). Traditional western conservation ideas have promoted an ecology-based approach to decision-making, which has led the scientific discourse to become increasingly hegemonic at the expense of experience-based lay knowledge (Cashore, 2002; Goldman, 2007; Jacobsen & Linnell, 2016). The natural sciences are often presented as unbiased and apolitical, even though they are based on value judgements and interpretations according to specific cultural and historical contexts (Wilhere 2008, Campbell 2012). This has paved the way for top-down approaches based on technical-ecological reasoning. Most are monitored and enforced from a national or international level, thus weakening local autonomy (Brockington et al. 2008, Biermann and Mansfield 2014, Reed and Ceno 2015). However, local actors are not always powerless or unable to give saliency to their own discourses. Social networks and alliances can enable groups to advance their concerns on the political agenda, notwithstanding the evidence base of their claims (Redpath et al. 2017, von Essen 2017, Hodgson et al. 2018). This is often enabled by deliberate selection or production of information to support particular viewpoints, sometimes adopting scientific rationality to legitimise the claim (Peterson et al. 2010, Karieva et al. 2017, von Essen 2017).

As the HWI research field was expanded into the humanities, it became increasingly clear that effective and just conservation management requires an understanding of people's internal responses to LCs and reconciliation between people of incongruent priorities and ontologies (Madden and McQuinn 2014, von Essen and Allen 2019). The aim of reconciliation changes the purpose and use of social interventions, such as participatory approaches or economic support. They are no longer seen as a mere stepping-stone for LC conservation, but as a crucial element of just transformation within rural landscapes, described as “radical shifts in social-ecological system configurations through forced, emergent or deliberate processes that produce balanced and beneficial outcomes for both social justice and environmental sustainability” (Bennett et al. 2019: p. 3881). Enacting just transformation to coexistence requires reflective and effective institutions which can account for the multiple and often conflicting demands of shared landscapes, as well as amplify benefits and mitigate drawbacks of wildlife across different scales (Leach et al. 2007, Walker 2009, Hartel et al. 2019). The need for inclusive and forward-looking approaches (e.g. scenario analysis) is increasingly emphasised by researchers and practitioners alike, as they are considered more effective in galvanizing positive social change than traditional top-down and problem-focussed approaches (Bennett et al.

2015, Redpath et al. 2015, Hovardas et al. 2017). Research on conservation governance therefore increasingly draws on the principles of good governance: based on legitimacy, transparency, accountability, inclusiveness, fairness, resilience and connectivity, in order to ensure durable conservation outcomes (see Lockwood 2010, Hartel et al. 2019).

Research gap and thesis rationale

These principles underpin a new wave of coexistence research and guidelines: focusing on planning and monitoring (IUCN HWCTF 2020, Jiren et al. 2021, Marchini et al. 2021, Durant et al. 2022); and on participation, social learning and stewardship (Hovardas 2020, Salvatori et al. 2021, Young et al. 2021). This body of work informs what is termed in this thesis as *coexistence governance*, a holistic, inclusive and biocultural approach to HWI governance based on just transformation agendas (Bennett et al. 2019, Büscher and Fletcher 2019). This approach to governance is instrumental to challenge mainstream conservation approaches and break the cycles of protection and prosecution that have tended to afflict LC governance (Mech 1995, Sjölander-Lindqvist et al. 2020, Fiasco and Massarella 2022). However, qualitative studies of the processes of knowledge production and policy-making are still rare (Pooley et al. 2017). Moreover, most research remains focussed on actors (mostly local) who are negatively impacted and/or who have intolerant attitudes to LCs; and how they can be engaged or incentivised to achieve particular conservation outcomes. The perceptions and behaviour of LC supporters and conservationists, including NGOs, and their role in driving disputes, is often overlooked (Lozano et al. 2019, Pooley et al. 2020, Pooley 2021).

Chapter four engages with these research gaps, by empirically exploring how coexistence discourses are mobilized and reproduced at local and national scales by different actors, the truth claims they presuppose and how they are linked with institutional conduct. The study is focussed on Spain's new wolf protection regime and coexistence strategy (2022) and the epistemological, political and legal factors on which it is based. Through this focus, the chapter illuminates how certain groups have gained interpretative precedence within LC governance in Spain, and the potential impact on coexistence capacities and stewardship in the case study sites. This knowledge is crucial to improve understanding and identification of prevailing barriers to transformative agendas and just and equitable strategies for overcoming them (Leach et al. 2007, Fazey et al. 2016).

1.3 Study area: Human-wolf coexistence in Spain

The following section provides background to the case study upon which the thesis is based. It is focussed on human-wolf interactions across three sites in north-western Spain, a region with a long history of conflict and coexistence with wolves. The case study was chosen because of its nuclei of permanent wolf habitat, from where wolves are expanding and recolonising old and new ranges across the region (see case study criteria in section 1.6.2). Below, a general overview of the species ecology and the national and administrative context is provided. The case study sites are introduced in depth in the following chapters (two and three), with additional details in Appendix A, and are therefore only briefly summarised in this section. Similarly, the Spanish legal framework related to wolves is introduced in depth in detail in chapter four.

1.3.1 Introduction

Spain offers a particularly interesting case for studying the evolution of HCIs and landscape restoration since it hosts some of the greatest diversity of ecosystems and priority habitats on the European continent (González Díaz et al. 2019). Almost 30% of the land area is legally protected and falls into IUCN category V (protected landscape) and the EU's Natura 2000 network (Fuentes et al. 2011). These areas represent habitats deeply transformed by millennia of human use and interventions, such as controlled burning, agriculture and hunting. In particular, Spain's remarkably long history of pastoralism and associated cultures has yielded and sustained some of the richest temperate grasslands and silvopastoral systems on earth (López-Sánchez et al. 2016, González Díaz et al. 2019). Consequently, a significant proportion of Spain's biological and cultural diversity, within as well as outside protected areas, is dependent on traditional land-use systems. Despite modernization, these systems have survived in many marginal and mountainous areas of the country (Fuentes et al. 2011, San Miguel et al. 2016). This includes extensive (free-range) grazing of cattle, sheep and goats. Various communities maintain semi-nomadic practices, also described as "transhumance", i.e. moving with livestock between summer and winter pastures, as well as artisanal production of meats, cheese and other products of high quality and cultural value. These practices have formed the backbone of the country's economy and yielded international recognition for its agricultural produce and scenic landscapes (Ruiz et al. 2016, San Miguel et al. 2016, López and Pardo 2018).

Following the trend of other western nations (see section 1.2.2), Spain's countryside has experienced a significant socio-ecological transformation over the last century (López-Sánchez et al. 2016, Hinojosa et al. 2018). A continuing trend of rural depopulation has resulted in a “dying interior” (Gómez 2014), with an aging population, crumbling infrastructure and social services and revegetation of previously productive land (mainly by forest and scrub) (San Miguel et al. 2016, Recio et al. 2020). With the exception of Madrid, the population (approximately 47 million in 2020) is now concentrated along the coasts, and it is estimated that 53% of the territory is inhabited by only 5% of the population (Pinilla and Sáez 2016, Sánchez-Mesa Martínez 2019). The forces of modernisation have hit remote and marginal areas particularly hard, causing widespread abandonment of rural villages, pastoral cultures and traditional land uses (Keenleyside and Tucker 2010, Recio et al. 2020). The trend has been exacerbated by the EU Common Agricultural Policy (CAP) and the way it has been interpreted by Spain. Due to its focus on rationality and yields, and its bureaucratic requirements, the policy has disfavoured small-scale, low-intensive farming practices. Coupled with decreasing profit margins and increasing competition, this has pushed many smallholders into abandonment or intensification (Navarro and López-Bao 2018, Marino 2019, Díaz et al. 2021). The low densities of people and increased vegetation cover have contributed to the recovery of ungulate populations across vast areas of rural Spain. It has also been favourable for the country's carnivores, including the wolf (Blanco and Cortés 2002, 2009).

1.3.2 Wolf ecology

The grey wolf (*Canis lupus*, see Figure 1.1) was once the most widely distributed non-human mammal on Earth, found across North America and most of Eurasia (Linnell 2013b, Mech 2017). It is a generalist species that lives and hunts in family groups (packs), often within an established territory, although wolves of both sexes can disperse hundreds of kilometres to find a mate or suitable habitat. Due to their large home ranges (from 100–1000 km² depending on the prey base), high reproductive potential (litter sizes ranging from 1-11) and dietary flexibility, wolves often come to compete with humans over space and resources (Mech 2017, Kuijper et al. 2019). While the wolf is mainly carnivorous and tends to specialise in large-bodied wild herbivores, they can also feed on small and medium-sized vertebrates, as well as berries, insects and carrion. They also take advantage of human food sources such as garbage, livestock and pets (Linnell 2013b, Chapron et

al. 2014). Over the last century, these characteristics motivated heavy persecution in order to protect human livelihoods, leading to local/regional extirpation of wolves across parts of their historical range (Mech 2017, Linnell and Cretois 2018). In recent decades, the negative population trend has turned, and the global population has been listed as “Least concern” by the IUCN since 1996 (Boitani et al. 2018).

As an apex predator, wolves can influence ecosystems in various ways. This includes direct effects on their prey, indirect effects on their prey’s plant resources and suppression of smaller mesopredators, which can produce cascading effects throughout the food web (Ripple et al. 2014, Wilmers and Schmitz 2016). One of the most emblematic examples of such trophic cascades occurred in Yellowstone National Park, USA. There, the reintroduction of wolves was attributed to the production of “landscapes of fear”, in which prey species avoid or are limited in areas with higher predation risk, contributing to a release of grazing pressure and restoration of plant communities (Ripple and Beschta 2012, Beschta and Ripple 2019). However, the extent of these effects and their attribution to wolves alone have in recent years become increasingly questioned (Marris 2017, Fleming 2019), particularly within the European context, where the food web is significantly altered by human presence, agricultural practices and the widespread availability of domestic species (Kuijper et al. 2016, Ciucci et al. 2020, Ausilio et al. 2021).

However, as a highly charismatic animal, wolves are not only a keystone species in the ecological sense but also in the human mind. Over centuries, they have been the protagonist of stories, legends and beliefs, revered and reviled depending on the context (Álvares et al. 2011, Rutherford 2022). More recently, they have come to represent both the demise and the salvation of rural nature, a perception that tends to be influenced by the distance to the nearest wolf pack (Skogen and Kränge 2003, Karlsson and Sjöström 2007, Marris 2021). Consequently, as phrased by Mech (2012) and by Blanco (2017), any attempt to manage the physical animal while ignoring “the other wolf” (the one in our minds) will end in failure. Exploring what fosters coexistence with such a multi-faceted species can therefore provide important insights into how procedural and outcome legitimacy for coexistence policy might be improved and how mutual benefits for biological and cultural diversity may be promoted.



Figure 1.1. Iberian grey wolf in a pine plantation in Sierra de la Culebra.

Note: Photo provided by Fransisco Lema.

1.3.3 Wolf governance and legislation in Spain

The historical interactions between people and wolves in Spain can be traced through archaeological remains (such as stone traps and livestock corrals), cultural artifacts (e.g. place names, oral histories and rituals) and ongoing practices (including the use of a national breed of livestock guardian dog (LGD), *Mastines Leónesnes*) (Casas del Corral and García 2017). Many of the stories and practices were based on the perception of wolves as a pest, to be extinguished or expelled to remote natural areas.

A turning point for wolf conservation in Spain occurred in 1971, when wolves' national status was changed from "vermin" to "game species" (Blanco and Cortés 2009). Since then, the legal and practical management of the species has become more complex and contested. This can partly be explained by Spain's federal structure. The country is comprised of 17 autonomous communities (ACs) and two autonomous cities (Ceuta and Melilla), which makes it one of the most decentralised and divided countries in Europe, both culturally and politically (Sánchez-Mesa Martínez 2019). The ACs have their own elected parliaments, governments and public administrations. The ACs are in turn subdivided into two additional tiers of governance: provinces and municipalities, each with some level of autonomy. In the past, this meant that the central government has played a relatively marginal role in LC governance, which is under the jurisdiction of each AC. They were responsible for developing their own LC management

plan, hunting quotas, lethal control and translocation, as well as LC support and compensation programmes (Trouwborst 2014, Blanco 2017).

However, the management plans have to be based on the criteria of the national wolf conservation strategy, which is provided centrally by the Ministry for Environment (MITECO). Until recently, it was based on a version approved in 2006 (Ministerio de Medio Ambiente 2006), wherein management was geographically divided according to wolves' categorisation on the European Habitat Directive (Directive 92/43/EEC). The Directive was ratified by Spain in 1992, at a time when few packs were established to the south of the Duero River (see Figure 1. 2). The river was therefore adopted as an administrative barrier: wolves to the south became included on Annex IV and II of the Directive (strictly protected), while wolves to the north were listed on Annex V, which permits hunting and culling provided "favourable population status" is ensured (Trouwborst 2014, Blanco 2017, Salvatori et al. 2021).

The management of the wolf has been contested ever since the Duero became the dividing line, with some arguing that the flexible regime of northern populations should be expanded across the country, whereas others advocate for the opposite. National and regional institutions have repeatedly sought an amendment to the Directive according to the former, but they were refused by the EU (Trouwborst 2014, Blanco 2017). In 2021, after a nomination from a pro-wolf NGO, MITECO decided in favour of including wolves on the national list of protected species (LESERPE) (MITECO 2021a). The decision renders wolves strictly protected across the country. This means that the ACs will no longer be able to regulate the population through hunting, and that culling must be justified according to more stringent criteria and bureaucratic procedures. The decision was extremely polemic and has been critiqued for being politicised and based on inconclusive evidence. The opposition was particularly fierce among the ACs that harbour the majority of Spain's wolves (Miranda 2021, Sánchez 2021a).

Previous studies have analysed the rationale and influence of Spain's wolf management strategies (Trouwborst 2014, Blanco 2017, Marino 2019), and the procedural and distributional interventions needed to improve the social acceptability of wolf presence (Ottolini et al. 2021, Salvatori et al. 2021). However, the uptake of these findings and recommendations among national institutions has yet to be explored. The 2021 decision presents an important opportunity to analyse the process of coexistence policymaking in Spain and to explore the scientific and popular discourses that come to

shape it. This knowledge is vital to understand institutional conduct and prevailing barriers to just transformation agendas (discussed in section 1.2.4) and is therefore the focus of chapter four of this thesis.

1.3.4 Three states of wolf expansion

The wolf conservation debate in Spain has been based on a belief that they used to be present across most of the Iberian Peninsula (Valverde 1971, Durá Alemañ 2021). However, a recent study of historical records (from 1846 and onwards) suggests that the population was not large and continuous, but scattered and fragmented into small units (Nores and López-Bao 2022). Their numbers started to plummet as human and livestock densities increased, primarily driven by persecution (which was sanctioned until the 1970s), habitat loss and competition over dwindling game populations (Blanco and Cortés 2002, 2009, Recio et al. 2020). However, unlike in many other European countries, the wolf was never extinct in Spain. A small, fragmented population persisted in remote areas of Galicia, Castile and León and Asturias, from where they in the last 50 years have made an astonishing recovery. Wolves have now recolonised most of the north-west, although approximately 95% of the population remains in the above-mentioned ACs (Blanco 2017), see Figure 1. 2. While wolves in Spain show a preference for forested and mountainous habitats with low human population density, they have also expanded into areas previously thought unsuitable, including intensively modified agricultural areas (Blanco and Cortés 2009, Llaneza et al. 2012, González-Díaz et al. 2020). The population is today comprised of close to 300 packs (approximately 2,500 wolves), and the Iberian population, which is shared with Portugal, is one of the largest in Europe (MAGRAMA 2016, Boitani 2018).

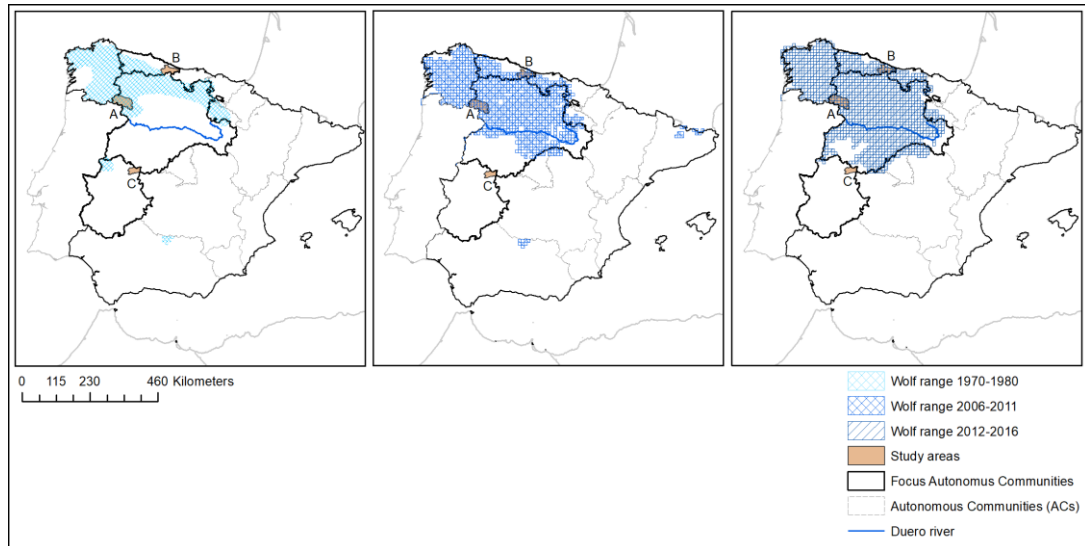


Figure 1. 2. Visual representation of Iberian wolf recolonisation across Spain since the 1970s and its relation to the case study sites.

Note: Also in chapter three, see section 3.3.2 for additional details and references.

This thesis traces the process and implications of their recovery by exploring three states of wolf presence: Permanent (state A), return within the last human generation (state B) and likely return within the current/next generation (state C) (see section 1.6.2 for detailed selection criteria). This novel research approach illuminates lessons about adaptive needs and capacities from each of these states, which can provide key insights into how to achieve proactive coexistence governance in Spain and elsewhere.

State A was explored in the area Sanabria-La Carballeda (S-LC) in the province of Zamora, Castile and León. The area is characterized by a harsh climate and the eroded hills of La Carballeda (800–1,200 MAMSL), with intermingled pastures, holm oaks, pine plantations and heather moorland. The study sites are located in the northwest of the region, to the north of the Duero river. Wolves here are catalogued in Annex V, which enabled the regional government to maintain the practice of trophy-hunting and culling (Trouwborst, 2014). Because of the wolf's continuous presence, the area's dwindling livestock owners have to a large extent maintained traditional damage prevention practices, including accompanied grazing, night-time enclosure and LGDs (Vicente et al. 2000, Lora Bavo and Villar Lama 2020), see Figure 1.3. Due to growing wolf-watching tourism (concentrated in the hunting reserve Sierra de la Culebra) and local residents' generally accepting attitudes, the area has gained international acclaim as a wolf hotspot and a proof of concept for human-wolf coexistence (Martínez 2019). This makes S-LC a particularly interesting case for studying how

coexistence is understood and experienced, how it has been shaped by past land-use practices and how current trends are impacting local coexistence capacities.



Figure 1.3. Sheep grazing under the watchful eyes of livestock guardian dogs in Sanabria.

State B was explored in and around the Picos de Europa national park (PENP) in eastern Asturias (Oriente de Asturias). PENP is Spain's first national park, established in 1917. It is famous for its scenic alpine meadows and pastures among the jagged peaks of the Cantabrian range (0–2,600 MAMSL) (see Figure 1.4) and for its artisanal production of cheese (Izquierdo and Barrena 2006, López and Pardo 2018, OECC 2019). Because of its high density of livestock, wolves were heavily persecuted in the area and believed to be completely extirpated in the 1950s or 60s (Blanco 2017, Llaneza 2017). Reestablishment from the south of the mountain range commenced in the 1980s, with the first recorded reproduction in 1998, and today wolves are fully established across most of Asturias, (see Figure 1. 2). The return has been accompanied by significant rates of livestock depredation (3300-4600 killed yearly between 2012-18 (GPA 2019)) and social backlash, including protests, negative media coverage and illicit killing of wolves (Llaneza et al. 2016, González-Díaz et

al. 2020). While they are catalogued on Annex V in the region, wolves are not considered a hunting species, but they have been continuously culled by the administration to mitigate attacks on livestock (GPA 2018). Damage prevention methods had largely been abandoned in the 60s, but are slowly re-emerging throughout the region. There is also an interesting initiative to promote wolf-compatible grazing (“pro-biodiversity lamb” Fundación Quebrantahuesos 2020). This makes the area particularly suitable for studying the experiences, impacts and lessons of LC return.



Figure 1.4. View over the lakes of Covadonga in the centre of Picos de Europa National Park.

State C was studied in La Vera in the province of Cáceres, Extremadura, where wolves have been functionally extinct for at least fifty years (Rico et al. 2000, Fernández Marugán 2020). La Vera is known for its mild climate and terraced cultivations of fruit and vegetables, see Figure 1.5. The slopes of the Gredos mountain range (400–2,400 MAMSL), were traditionally grazed by high densities of goats, but the sector has been decimated by low profit margins and reoccurring outbreaks of bovine tuberculosis (Urivelarrea and Beaufoy 2019). The decrease in livestock numbers and absence of LCs have increased the importance of the trophy hunting sector, particularly for the internationally sought-after Ibex (*Capra pyrenaica*)(Carrasco-García de

León 2015, Rengifo Gallego and Sánchez Martín 2016). The area is located to the south of the Duero River, where the wolf is catalogued on Annex IV, and it has been listed as critically endangered in Extremadura since 2001 (Fernández Marugán). The southernmost front of current wolf recolonisation is found on the northern side of Gredos (see Figure 1. 2), in the province of Ávila, where it has caused some of the highest livestock mortality by wolves in Spain (JCyL 2018, Blanco et al. 2021). This makes La Vera particularly relevant for exploring adaptive needs and capacities among local resource users and proactive approaches to addressing them.



Figure 1.5. Cherry plantations at the foothills of the Gredos range in La Vera.

1.4 Aims and objectives

The research aim of this thesis was distilled from the research gaps identified throughout sections 1.2 and 1.3. The aim has been revisited and refined throughout the project, as perspectives and ideas emerged during the fieldwork, and due to the constantly shifting institutional and political environment over the last four years (including Covid-19 and changes in Spanish wolf policy). The aim has been particularly shaped by insights from

Spanish collaborators regarding where and how coexistence is locally manifested, and how it can be studied.

In summary, the thesis aims to understand the conditions of equitable and resilient coexistence at different states of LC presence, illuminate just transition pathways towards mutual flourishing and identify prevailing barriers to implementation.

This aim is approached through the following objectives:

1. To explore the underpinnings of coexistence in an area with long-established and comparatively harmonious human-LC relations, as experienced and understood by local resource users and managers.

- Addressed in chapter two through a study of an existing and well-known case of human-wolf coexistence in Sanabria-La Carballeda.

2. To describe the main components and prerequisites of resilient coexistence, and explore how they are manifested at different states of LC presence.

- Addressed in chapter three by introducing a framework for resilient coexistence, and applying it to explore adaptive needs and capacities in three areas at different states of wolf expansion (permanent, recent return and imminent return of wolves).

3a. to explore interpretations and visions for coexistence and rural nature, locally as well as in public debates, and the associated pathways toward them.

- addressed in chapter four by exploring how people in the study areas perceived current and future functions and interactions of wolves and people within the local landscape, contextualised by debates in the media at local and national scales.

3b. to determine what priorities and forms of knowledge are considered in coexistence governance and policy-making and how these may shape local coexistence capacities.

- addressed in chapter four by studying a recent change in the wolf protection regime in Spain, the discourses and knowledge systems that were considered in the process and which underpinned the country's new coexistence policy.

1.5 Research design

Throughout sections 1.1 and 1.2, calls for more in-depth empirical research on the processes and conditions that underpin coexistence were highlighted, while section 1.3 illustrated the intricate socio-political context for human-wolf interactions in Spain. In order to study these phenomena, this thesis will primarily draw on perspectives and approaches from conservation social science (Bennett et al. 2017). This field is becoming increasingly influential because of its capacity to illuminate and address the psychological and political dimensions of conservation and ask the *how* and *why* questions that can help explain people's internal responses to wildlife (Pooley et al. 2017, 2020, Lozano et al. 2019). Notwithstanding their rationality or factual basis; beliefs, values and perceptions influence people's experience of the world, and are therefore critical for understanding the impact of LCs on peoples' well-being, behaviour and (lack of) trust in governing institutions (Ajzen 1991, Stern 2000, Blumberg 2015). In other words, veracity is not the point (Bacchi 2021). By exploring perceptions, their origins and how they unite or antagonise people, it is possible to illuminate underlying drivers of particular HWIs, and pathways toward reconciliation and mutually beneficial solutions (Madden 2004, Tadaki et al. 2017, von Essen and Allen 2019).

This research is needed to complement the accumulated body of literature which quantitatively evaluates and/or provides technical (apolitical) solutions to negative wildlife impacts and human intolerance, which retain a dominant role in guiding conservation governance (Pooley et al. 2020, Hansen et al. 2022). Future governance approaches must adopt a broader scope, since “the legitimacy, saliency, robustness and effectiveness of conservation decisions and actions will increasingly depend on rapid social learning and institutional adaptation based on multiple types of knowledge” (Bennett et al. 2017: p. 104) This type of knowledge is best gleaned through approaches which lets impacted stakeholders express their perspectives and experiences freely, and which provides the researcher with a situated understanding of the location and processes in question (Rust et al. 2017, Salvatori et al. 2021).

This thesis consequently adopts a qualitative case study approach that generates knowledge through a process of inductive reasoning. The multi-method workflow was divided into five phases according to the above-defined objectives, see Figure 1.6. The subsequent section details the theoretical underpinnings and methodological approach of the thesis.

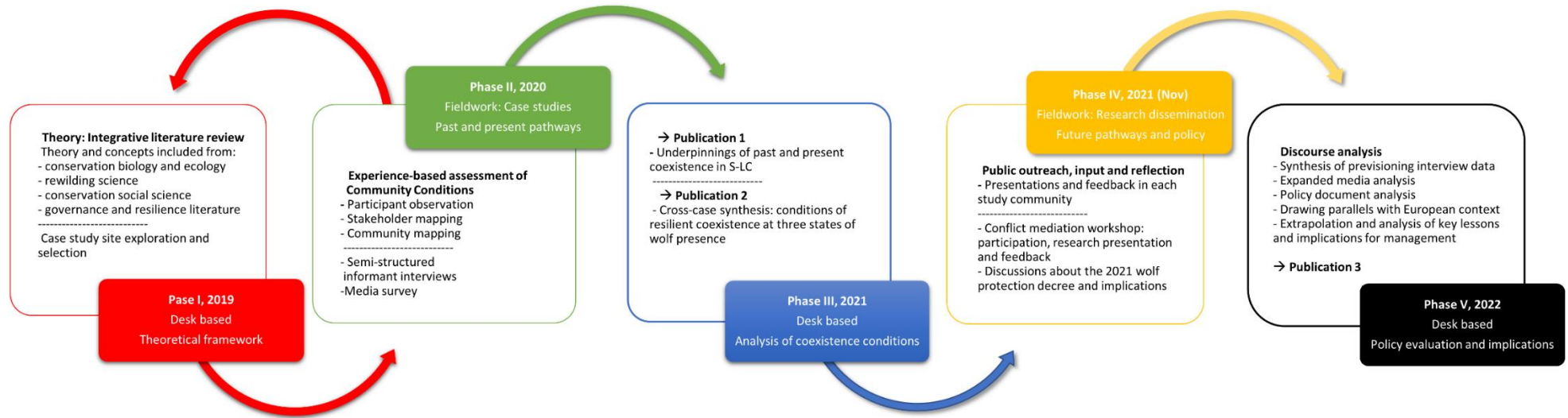


Figure 1.6. Visual interpretation of the thesis workflow.

Note: Illustrates the iterative process of the research design, based on the spiralling research approach (Berg and Lune 2014).

1.5.1 Interpretative paradigm and theoretical underpinnings

In section 1.2.4, the political nature of conservation was highlighted, and the role of culture and values in shaping peoples' understanding of nature. This thesis therefore applies a post-structuralist sensibility to study the perceptions which give meaning to the interconnections between the cultural and natural worlds. Post-structuralism acknowledges the role of language, custom and power in the creation of social reality and knowledge, including that of the researcher (Graham et al. 2010, Bacchi 2021). It has been widely applied to challenge particular framings that produce and reproduce social or inter-species injustices, such as the ontological fixity of nature and the notions of "native" and "invasive" species (Cronon 1996, Demeritt 2002, Marris 2011). Post-structuralism is conducive to the pathways approach (discussed in section 1.2.3). It acknowledges that different ontologies and contexts might yield different conclusions about the appropriate way forward, and which rather than attempting to control variability strives to adapt and respond to it (Leach et al. 2010). This theory constitutes the "ontological glasses" through which the psychological and structural mechanisms of coexistence are interrogated within the thesis (Rutherford 2007, Biermann and Mansfield 2014). This lens makes it possible to render framings and aims visible and open for debate, which is important to elicit alternative pathways and facilitate a transparent appraisal of different policy options (Leach et al. 2010).

With post-structuralism as the interpretative paradigm, each chapter is expanded with additional theory and concepts to enable systematic reasoning in line with each research objective. In phase I of the project, which was completed in April 2019, the initial theoretical framework of *resilient coexistence* was outlined. Building on Carter and Linnell's (2016) coexistence definition, the framework consists of four conditions: Effective institutions, large carnivore persistence, social legitimacy and low levels of risk and vulnerability, nested within the SES concept. Following the spiralling research approach (Berg and Lune 2014), the framework was reviewed and revised according to insights and perspectives gleaned from phase II, see Figure 1.6.

In chapter two, this framework was combined with ideas from the Convivial conservation movement (Büscher and Fletcher 2019), in order to analyse the conditions of Sanabria-La Carballeda's coexistence state and pathway. Convivial conservation proposes the re-embedding of the uses of (non-human) nature into social, cultural and ecological contexts and systems, thereby departing from the nature/culture dualism. The final version of the

framework is presented and applied in chapter three to synthesise coexistence conditions across the three study sites. Finally, chapter four draws on the concept of green governmentality (Rutherford 2007, Luke 2016). This branch of political theory investigates the exercise of power in techno-economic forms to maintain order and protect the environment (Luke 2016), making it suitable to uncover and critically analyse prevalent coexistence discourses and policy strategies in Spain.

1.6 Methodological approach: In-depth case study research

Qualitative research is inductive and exploratory in nature and therefore well suited to study complex social-ecological settings, patterns and processes, while taking into account a plurality of participant perceptions of the systems in which they live (Freudenberger 1999, Berg and Lune 2014). In-depth case studies, where the researcher spends extended periods within the research environment, enable detailed inquiry of “how” and “why” questions posed in relation to contemporary phenomena (Yin 2003). It provides the flexibility to combine various data collection techniques and to adapt them according to the research context. These characteristics enable the generation of rich and locally relevant data, and the illumination of unexplored factors or solutions that would have been missed by hypothesis-driven approaches (Yin 2003, Rust et al. 2017).

The case study approach has been widely adopted to generate insights into the causal mechanisms of human-environment interactions and is becoming increasingly prevalent within conservation social science (Newing 2010, Margulies et al. 2016, Bennett et al. 2017). Within the HWI-field, it has been used to study the behaviour and knowledge of individuals, groups, organisations and animals; the interactions between them; as well as the impact of conservation interventions on community well-being (e.g. Barua 2016, Dorresteyn et al. 2016, Toncheva and Fletcher 2021). A challenge innate to the approach is the production of generalisable knowledge across broader regional and global scales, which is highly regarded by policy-makers and practitioners (Sutherland et al. 2004, Margulies et al. 2016). However, the focus on depth over breadth is often preferable to generate credibility, transferability and explanatory power of the socially mediated mechanisms through which coexistence is enabled or constrained (Rust et al. 2017, Pooley et al. 2020). Qualitative approaches are also more suitable to acknowledge and incorporate diverse knowledge and value systems (including local and indigenous knowledge), which have been largely overlooked or marginalised

within traditional conservation governance (Goldman 2007, Pascual et al. 2021, Hansen et al. 2022).

Through their inductive nature, qualitative methods allow the researcher to explore topics that are deemed important by the study communities or that are specific to the culture under study, while minimizing researcher biases and the risk of “parachute science” (Rust et al. 2017, Ruppert et al. 2022). This is vital to building procedural legitimacy for both the research itself and for the policy advice it seeks to generate, which could increase the probability of stewardship and perceived justice of policy outcomes (Mathie and Cunningham 2003, Milich et al. 2020, Saif et al. 2022). Case studies are therefore increasingly collated and reviewed to exemplify the plurality of ways in which coexistence can be manifested and promoted (e.g. Redpath et al. 2015, Hovardas et al. 2017, Salvatori et al. 2021), which provides inspiration and enables the amplification of “positive seeds” (Bennett et al. 2015, IUCN HWCTF 2021). Thus, while qualitative case studies may be of limited use to generate blue-print solutions, they do offer wider lessons about the structures, processes and considerations that are important for transforming HWIs and conservation policy (Madden and McQuinn 2014, Massarella et al. 2021), and was therefore deemed instrumental to achieve the thesis aim and objectives.

1.6.1 Operationalising the pathways approach

The thesis draws on the findings from the three case study sites to explore the socio-ecological conditions and processes that can foster and perpetuate coexistence in areas of LC expansion. It views and analyses the study sites as complex adaptive systems, situating wolf expansion as one among many ongoing and interconnected social and environmental transitions that are impacting the study sites (Leach et al. 2007). The case studies were carried out in the form of an experience-based assessment of community conditions, an ethnographic, in-community methodology which elicits “the experience and knowledge of community members to characterize pertinent conditions, community sensitivities, adaptive strategies and decision-making processes related to adaptive capacity or resilience” (Smit and Wandel 2006: p. 285). It can be characterised as a grounded-theory type approach, which allows for interpretative flexibility during data collection and analysis, and the construction of a research narrative from the data itself.

From its vantage point within the system of study, this methodology allows for the exploration of multiple stimuli beyond those related to the main issue (in this case wolves), and how these stimuli are locally manifested. It is therefore

well suited for appraisal of the complex SES within which human-wolf interactions are embedded (Berg and Lune 2014, Lischka et al. 2018). The multi-state, multi-level research design (i.e. including the perspectives of decision-makers, resource users and policy advocates within the study sites) was selected to elicit a broad overview of the lessons from each state of wolf presence. Through this methodology, the thesis contributes findings that are generalisable to similar contexts of expanding wildlife in humanised landscapes, which can inform proactive planning approaches to wildlife (re)colonisation, both passive (in which they move of their own accord) and active (human-assisted introduction).

1.6.2 Case study selection: Criteria and process

In order to explore the process of adaptation to LC-return, the research focussed on traditional agricultural communities that are or will be sharing space with wolves, according to the research criteria presented in table 1.1. As highlighted in section 1.3, wolves were chosen because of their status as a highly charismatic keystone species, and the widespread view that their expansion represents one of the most complex coexistence challenges in the northern hemisphere (Mech 2017, Kuijper et al. 2019).

Table 1.1. Selection criteria for the case study sites (a-c).

Criteria – rural areas....:	Rationale
<p>a.</p> <ul style="list-style-type: none"> - With continuous presence (according to the best available historical information or living memory). - With comparatively harmonious coexistence in the last few decades, i.e. known for accepting attitudes, effective coping mechanisms and/or low levels of negative impacts (on people and wolves). <p>b. Where wolves had become extinct, and then returned within the last human generation, and where signs of mutual adaptation are evident.</p> <p>c. Where wolves are likely to return within the near future, i.e. a population is established nearby, with no physical or legal barriers preventing them from further expansion.</p>	<p>a. To explore the ecologically and socio-culturally mediated conditions that underpin durable coexistence.</p> <p>b. To study the processes of (re)adaptation to coexistence and the factors that have enabled or constrained it.</p> <p>c. To explore adaptive needs and capacities, and how they could be proactively enhanced.</p>
<ul style="list-style-type: none"> - With low population density and remaining pastoral cultures, located in a mountainous and/or marginal area, experiencing demographic and/or cultural shifts. - With ecological suitability for wolves, i.e. favourable habitat conditions (Llaneza et al. 2012), and possibilities to spatially or temporally separate wolf and human livelihoods. - With some level of legal and/or social endorsement of wolf protection and restoration. 	<p>To be able to study processes of biocultural restoration and rural adaptation from a systems perspective, in a location that appears to have favourable environmental and legal conditions for coexistence.</p>
<p>With the presence of a project, initiative or programme addressing one or several of the coexistence conditions.</p>	<p>To be able to analyse deliberate pathways/strategies, their rationale and effects.</p>
<p>That are Spanish, English or Swedish-speaking.</p>	<ul style="list-style-type: none"> - To enable flexibility, perceptivity and adaptation to the local context. - To decrease the distance between the researcher and the study communities and participants. - To enable participant observation and interviews without translation and thereby avoid translation costs.

Sites that matched the criteria, which are presented in table 1.1, were identified through a combination of purposive online searches and expert advice. This included consultation with experienced researchers on the HWI topic, and, once Spain was selected as the country of focus, Spanish LC experts José-Vicente López Bao and Juan Carlos Blanco (see notes on collaboration below). This approach was deemed appropriate to rationalise the selection process and ensure that the research findings were both building on previous work and contributing to the national and European policy context. Site exploration and contact with experts took place during the exploratory stage proceeding the literature review (phase I, 2019, see Figure 1.6). An initial list of potential sites within each state of wolf presence was produced by consulting historic and present wolf range data, facilitated by López Bao, and overlaying this with socio-economic and demographic data (carried out in ArcGIS, see Figure 1. 2).

1.6.3 Scoping visit and collaboration

A scoping trip was conducted in November 2019, lasting two weeks. The purpose of the trip was to assess the viability of the study design, survey potential sites and pilot the data collection methods. This enabled the researcher to “access the field setting”, an important first stage of an ethnographic study (Berg and Lune 2014). The focus was on Sierra de La Culebra (SdIC, site A) since this was to be the first study site, and since the research there would likely influence how and when the other sites were approached (although the context in Asturias was also explored). Several villages were visited within each site, which enabled confirmation of initial interest and engagement among locals and thereby the viability of the qualitative research approach.

During the scoping visit, initial contact was also established with a number of stakeholders that are prominent in national coexistence debates in Spain. They included members from Fundación Entretantos (<https://www.entretantos.org/>), with whom informal collaboration was established. Entretantos is an NGO which seeks to promote social participation and knowledge co-production in areas related to sustainability and environmental management. They are responsible for the successful, national-level wolf conflict transformation initiative Observatorio Grupo Campo Grande (GCG <http://www.grupocampogrande.org/>), which has its administrative base near SdIC. They constituted an important “gatekeeper” for the research, providing initial informant connections and background information about the study sites.

In addition to Entretantos, the above-mentioned López Bao and Blanco were also collaborators throughout the research. They provided logistical and advisory support which greatly facilitated case study selection, ensured the relevancy of the research objectives and enabled access to data. They were also consulted during the write-up phase to cross-check the validity of the research and provide feedback on the manuscripts, and are therefore acknowledged as co-authors in chapters three and four respectively.

1.6.4 Data collection

The data for phase II of the thesis was collected over the course of one year, from January 2020 to December 2020, with three to four months spent at each study site. In line with the methodological approach (described in section 1.5.2), a complementary array of ethnographic methods were used to collect and triangulate data, which facilitated cross-validation and enabled sampling biases to be limited (Cresswell and Plano Clark 2011).

Each case study was initiated with a passive phase, in which the researcher spent time in public spaces, got to know the local context and made initial connections. Concurrently, an **iterative stakeholder analysis** was conducted, adapted from Prell, Hubacek and Reed (2008). This consisted of the initial identification of relevant stakeholders according to certain characteristics, such as local residents, shepherds and protected area managers, which was complemented by asking people to provide additional names and explain how they were related to the topic (i.e. purposive and respondent-driven sampling (Berg and Lune 2014)). This enabled a continuous expansion of the network of relevant stakeholders, according to what types of actors and phenomena that were deemed important by those who participated in the research. During this process, stakeholders and views that were less visible or that were divergent were actively sought and considered, in order to create an overview as holistic as possible given the scope of the project (Leach et al. 2010, Prell et al. 2016). Care was taken to not view participants as “locked” in predetermined, strategic positions, since people have multiple overlapping identities, often influenced by varying social contexts (von Essen and Hansen 2015, Hansen et al. 2022).

Throughout the fieldwork, **Participant observation** was conducted at local meetings, events and during everyday activities. Observations, insights and contextual information (e.g. landscape characteristics and background to particular events) were recorded continuously in a field diary, supported, where possible, by photos. This enabled the identification of recurring themes across the sites and continuous adaptation of the research focus (Rust et al.

2017). A continuous **media survey** (local, national and social media) was carried out, from which an overview of prevalent storylines about wolf conflict and coexistence was gained, as well as other topics relevant to village and landscape management. The survey was cross-validated through a published media analysis by Delibes-Matéos (2020) and a yearly wolf media summary produced by Entretantos (2021). This dataset also included documentaries and other filmed material on topics related to coexistence, which are detailed in Table I., Appendix I.



Figure 1.7. A typical day of fieldwork: The researcher accompanying a shepherd in La Vera, Cáceres.

Note: Photo by Andy Solé, published in El País as a part of an interview about the research project (Fanjul 2020), see table G.1, Appendix G.

The stakeholder analysis and contextual survey informed the selection of key informants, with whom **semi-structured interviews** were conducted. Informant interviews are useful to gain an in-depth understanding of the opinions and beliefs of stakeholders who have specialized knowledge based on their positions in society (Yin 2003, Nilsson et al. 2017). This method provided a combination of structure and flexibility by being open-ended and by following up on the unexpected (Chambers 1994). The majority of the interviews were carried out face-to-face (three took place over skype), mostly individually but sometimes including several people, lasting from 30 minutes up to 2 hours. Several interviews were conducted as “walk along”, e.g. while

the shepherd was herding goats, in order to access unarticulated forms of knowledge and gain a deeper understanding of the local context and conditions (see Figure 1.7). The interviews began with questions about local conditions, such as "what is it like being a shepherd in this area?". The topic of wolves, unless brought up by the informant, was explored at the end of the interview, in order to glean whether it was the main concern or not. The last part of each interview was future-oriented, asking the informant about probable and desirable scenarios for human-wolf interactions and the landscape, and how they envisioned realising them. The majority of interviews were digitally recorded, transcribed and translated. Where audio recording wasn't possible or practical, notes were taken during or directly after the interview. In total, 92 interviews were carried out, approximately 30 per site, presented in detail in Table I., Appendix I. This outcome was partly determined by saturation, meaning that the interview-stage was considered complete when few new perspectives or insights were gained by additional interviews, and because of the time constraints of the project. The data from phase II was instrumental for capturing complexities and exploring the "why", which for this thesis was needed to illuminate the framings, values and rationales that underpin past and present coexistence capacities (Leach et al. 2010, Berg and Lune 2014).

For phase IV of the thesis (chapter four), an argumentative discourse analysis (Hajer 2006, Scott 2017) was employed to explore dominant coexistence framings and priorities within the case study sites; in popular debates (the media); and within Spanish policy. This analysis was based on two sets of data. Firstly, the material collected during phase II, extended with observations from the dissemination trip (see below section). Secondly, purposefully collected publicly available documents, which: a) outlined the institutional framework for protected species in Spain (in particular for wolves), b) explained or introduced the change in the Spanish wolf protection regime in 2021 and c) outlined the outcomes of ongoing conflict mediation initiatives in Spain. This selection provided a broad overview of influential coexistence conceptualisations and priorities, how they become manifested (or not) in management plans and policy and how the new policy has been received and debated.

1.6.5 Research dissemination and validation

This thesis was completely dependent on the contributions of the individuals and organisations that participated in or supported the research. The research project underpinning the thesis was therefore designed with the explicit

intention of departing from extractive models, in which local knowledge is mined with little to no direct benefit to those involved (Newton et al. 2012). This model not only raises ethical issues but can also contribute to research fatigue, in which communities become disenchanted and unwilling to engage with future research initiatives (Newton et al. 2012). Allowing the participants to access and engage with the outcomes of the research is therefore crucial, particularly after the extended time and engagement required by qualitative research methods. In addition, it is an important part of validating the results, and to increase the impact of conservation research (Durant et al. 2019a).

In order to ensure an enriching rather than an extractive experience among participants, and to sustain connections for future research, a research dissemination trip was carried out in November 2021, lasting three weeks (phase IV, see Figure 1.6). The timing was motivated by three main reasons: Firstly, the first two academic papers (chapters two and three) from this thesis had just been published, and stakeholder feedback on this work was sought before writing up the third (chapter four). Secondly, Spain had just approved a decree for the strict protection of wolves across the country (in September 2021), sparking a range of activities to prepare for and protest against policy implementations. Thirdly, GCG held an annual meeting in order to advance its agenda in the face of the policy change, for which the researcher was invited to present the findings from the first two results chapters. This moment in time, therefore, offered an important policy window wherein the thesis findings could inform future strategies and interventions. The activities during the dissemination phase are presented in table 1.2.

In addition to the dissemination trip, extensive outreach and engagement has been conducted throughout the research trajectory, including presentations in local schools, interviews with national and international media and popular science writing, which is presented in detail in table G.1, Appendix G

Table 1.2. Research dissemination

Activity	Purpose	Outcomes
Presentation of findings at the GCG workshop in Sanabria.	Provide access to research findings, support the workshop and inform future strategies of the conflict mediation initiative.	Attended by approximately 40 members of GCG, including several research participants. Published in local media and on the GCG website (see table G.1, Appendix G).
Public presentations at each study site (A, B and C, one per location), advertised through personal invitations and posters in public spaces (see Appendix F and G), lasting 30 minutes + time for questions and comments at the end.	Reciprocate research findings to the study communities, ensure local access to the findings and validate interpretations with the participants.	Attended by 20-40 people at each site, including administrative staff and regional media (see table G.1, Appendix G).
Presentation for forestry and environmental management students in La Vera.	Raise awareness about proactive management of coexistence capacities to future civil servants and managers - in a community where wolves are expected to return.	Attended by 15 students.
A research policy brief published on the GCG website.	Summarise the findings in Spanish and English, making them accessible for interested parties and people who were unable to attend the event.	See Appendix G for a link to the publication.
<p>Popular science writing published in local, national and international media:</p> <ul style="list-style-type: none"> - Two local magazines in La Vera - A piece in The Conversation, published in the Spanish and English editions. 		See Appendix G for a link to the publication.

1.6.6 Data analysis and interpretation

The findings for the thesis were developed through a process of interpretation and evaluation. The full dataset (field notes, interview transcripts and documents) was processed through thematic analysis using the NVivo software (QSR International UK Ltd). This method is useful to gain a broad overview of the data and facilitate systematisation, interpretation and presentation of arguments (Attride-Stirling 2001). Coding took place on three separate occasions (one for each of the results chapters) in order to iteratively incorporate new data and reflections as they evolved throughout the research trajectory. Following the grounded theory-type approach (Mabon et al.,2020), an initial coding structure was created based on the research objectives for each chapter, which was expanded with categories and sub-categories as reoccurring themes were encountered in the data (Attride-Stirling 2001).

This approach allows novel themes to emerge from the data with minimal influence from the researcher's preconceived ideas but also implies several limitations with regard to replicability and generalisability. As described by Cotton et al (2014), the outcomes from inductive analysis are influenced by unconscious biases of the researcher and are co-created rather than discovered fully formed. The effect was moderated as far as possible by zigzagging between theory, literature and interview data, which allowed the cross-validation of identified themes with those from similar research elsewhere and to contextualise the findings with large-scale structures and discourses. Opportunities were also utilised to discuss the findings with locals during the dissemination phase, as well as with the wider research community. In addition to the various forms of local dissemination and feedback (see above section), this included discussions with colleagues and research groups working on similar themes, exchanges at international conferences (see table G.1, Appendix G) and peer-review of the academic publications.

Additional details about the analytical approach used for each research objective are presented within each chapter, and the final coding structures are presented in Appendices H-J.

1.7 Ethics and positionality

Research findings represent the outcome of a shared process, shaped by both the researcher and the participants. As such, there can be no research without positionality. As phrased by Bourke (2014: p. 3), “Positionality represents a space in which objectivism and subjectivism meet”; acknowledging that the production of knowledge is dependent on human interpretation, which is always mediated by values, and thus we can never truly divorce ourselves from our own subjectivity. The following section reflects on relevant considerations of the researcher's identity and experience, that of the participants, how they shaped the research process and the steps taken to minimise the influence of positionality on the rigour of the findings.

1.7.1 The researcher

I am a conservation social scientist who has been working on related issues for the past decade. The focus of the thesis: how coexistence can be promoted within multi-use landscapes, is an outcome of my concerns about the global biodiversity crisis and environmental sustainability, which impacted the research ontology and how I interpreted the data. However, the aim was also shaped by my experience and knowledge from growing up on a farm, contributing to my focus on rural livelihoods and connections with nature. Coupled with my post-structuralist approach to research, these perspectives explain my pragmatic view and representation of the ethical dilemmas inherent in coexistence debates, such as wolf hunting, and my criticism of authoritative governance approaches. However, my background and my experience within the HWI field from both my native context (Sweden), and previous research in Argentina (see Pettersson and de Carvalho 2020) also allowed contextualisation of the findings and, arguably, a deeper insight into the dynamics at play. As described in section 1.6.6, I sought input on my interpretations throughout the research trajectory and strived to be reflective and “take one step back” as I analysed the data. This mindset enabled me to lay bare several of my own assumptions and reframe my thinking on various issues as my understanding was expanded by the findings.

1.7.2 The researched

My particular mix of identities greatly influenced how I was able to engage with participants and the resulting data collection. As a female, academic and foreigner, I was an outsider and therefore had to consider how I

approached participants and informants, and the power dynamics inherent in the exchange (Sprague 2005). The first step was to clearly describe my background and research aim to people with whom I engaged, both during informal conversation and when interview requests were made, see Appendix C. My collaboration with Spanish researchers and organisations helped identify local contexts and sensitivities, in some cases also providing references through which I could approach an informant or context. By presenting myself as a social scientist from the University of Leeds (as opposed to a natural scientist, who were often considered "pro-wolf" by locals), and, when deemed necessary, referring to my farming background, I was usually able to establish trust and engagement. This was particularly important when talking to farmers and shepherds, who were sometimes cautious and reserved before this introduction. Among conservationists and civil servants, my academic profile helped provide credibility, although my focus on rural livelihoods and resilience may explain the lack of response to interview requests by some pro-wolf NGOs.

Informant recruitment and trust were also facilitated by my respondent-driven sampling approach, as my interview request often came with a reference from someone familiar to the interviewee. However, this approach also created some degree of gatekeeper bias, as the selection of relevant interviewees was shaped by these recommendations. As explained in section 1.6.5, this was mediated as far as possible through stakeholder analysis, and by constantly comparing local views with those represented in national media in order to glean whether certain perspectives appeared to be missing or overrepresented.

The research participants represented a wide range of interests, social classes and priorities (see Table I.1, Appendix I). My profile and focus influenced what they were willing to share with me and how. As explained in section 1.3, wolves can be an extremely sensitive, engaging and widely meaningful topic, and it may have been in the participants' interests to represent their views in a way that influenced my findings toward their priorities. While I was aware of this and continuously sought alternative perspectives, it was the point of my research to explore these phenomena and how they influence coexistence experiences and policy. Some participants may have been unwilling to volunteer certain information due to concerns about the social consequences of engaging with the topic. Other than guaranteeing their anonymity at the outset of the research (see the

section below), this was inevitable, and for ethical reasons, I never sought to press anyone on topics that may have been sensitive.

While I am fluent in Spanish, it is likely that certain local ways of expression passed me by or were misinterpreted, and that the participant adapted their language. During interviews and conversations, I strived to ask open-ended questions and let participants elaborate on issues important to them, and provide validation and positive feedback throughout (active listening, asking follow-up questions etc.) to show that I understood. Mitigating bias was also the reason for interviewing such a wide range of stakeholder types, and for the number of interviews, which was significant given the qualitative approach and time restrictions inherent in PhD research.

In summary, I have in the following three results chapters endeavoured to represent the findings through the eyes of an interested observer, while as far as possible representing local voices and knowledge in the construction of the narrative. I have also continuously interwoven the "know-how" of locals with the "know-why" of experts in order to trace the underlying structures behind observable phenomena and to contextualise the findings (Smit and Wandel 2006, Reed and Suckall 2008).

1.7.3 Ethical considerations

Since the research is based on work with human participants, the research proposal for this thesis was reviewed and approved by the Research Ethics Committee at the University of Leeds (AREA 19-018) before the fieldwork was initiated (see Appendix B). This proposal outlined key concerns regarding positionality, language barriers, contextual concerns, the sensitivity of the research topic and for how to manage participants' expectations. Some have been detailed in the above section, with the remaining concerns addressed in turn below.

Consent and anonymity:

The contentious nature of LC coexistence and the small size of the communities that contributed to the research made participant anonymization and informed consent primary concerns. The option to formally participate in the study was introduced to potential informants through a written invitation with an accompanying consent form (see Appendices C and D) usually after initial contact by phone or text message. Prior to their interviews, the consent form (which was translated to Spanish) was discussed to ensure that they understood the conditions and nature of their involvement. All participants were advised that any information provided

would be treated in strict confidence, that only information which they wished to share “on the record” would be used in the research and that the raw data, including transcripts, would not be made available to other people or purposes.

Sensitive information:

An important consideration was potential references to illegal behaviour such as illicit killing and damage to property. As the emphasis of the research was to explore coexistence conditions rather than conflict and illegal behaviours, it was not necessary to ask participants to elaborate on this topic. Any potentially sensitive data that did emerge and that was used did not contain identifying details (pseudonymity), and was not shared between participants or with other researchers.

Participant expectations:

Finally, it was important to consider expectations from participants that the research would contribute to changes in Spain’s coexistence policy or the participant’s particular situation. This was addressed in the information sheet, where the potential outcomes and impacts of the research were detailed. It also clarified that while individual participants may not benefit directly from the research, it may assist in drawing attention to local concerns about LCs, democracy, participation and other topics.

1.8 Novelty and contribution of the thesis

This thesis offers a number of contributions which advance conceptual and empirical understanding of human-wildlife coexistence. As highlighted throughout sections 1.1 and 1.2, empirical studies of positive or neutral HWIs are still limited, especially in comparison with the voluminous body of work on negative interactions and conflicts. By adopting a coexistence lens (which focuses attention on convivial aspects of HWIs) to analyse a well-known case of human-wolf coexistence, chapter two provides a significant empirical contribution to this emerging knowledge base. Through tracing how the interactions have changed over time, the study illuminates the conditions that enabled wolves to persist in the area (while becoming extirpated elsewhere), and which have contributed to relatively high levels of acceptance among the people who share space with them. This will be of interest to researchers and practitioners who work to facilitate rewilding of nature and (re)colonisation of challenging wildlife, also beyond Spain. It draws attention to the importance of amplifying and supporting

functioning/positive human-nature interactions and conditions and of addressing vulnerabilities that risk undermining them. This wider aperture to conservation (beyond addressing conflict and beyond human-nature separation) could inform shifts in planning processes, funding allocation and institutional collaboration toward more proactive and dynamic governance approaches that see humans and nature as intertwined. It will also be of interest to journalists and storytellers who seek to provide hope and nuance to global efforts to tackle the ongoing biodiversity and depopulation crises in the countryside.

The thesis furthermore adopts a ground-breaking approach to studying the process of wildlife expansion. By conducting in-depth ethnographic research on three distinct states of wolf presence, it advances knowledge of adaptive needs and capacities associated with their return to rural landscapes. Ethnographic data on values and perceptions of nature have until recently been an undervalued form of evidence in conservation, but is crucial to explain the behaviour and experiences of those who are impacted by a particular species or function of a landscape, as well as those who advocate for certain measures (e.g. strict protection or rewilding) from afar (Rust et al. 2017, Durant et al. 2019b, Pooley et al. 2020). The insights and lessons of this approach, which are presented in chapter three, are thus relevant to species conservation and nature restoration efforts elsewhere, beyond the wolf and Spain. Chapter three also introduces a new framework of the conditions of resilient coexistence, contextualised within its social-ecological system. By applying the framework to synthesise findings across the three case study sites, the chapter illustrates the importance of proactive approaches to supporting local livelihoods and wellbeing in the face of wildlife expansion, as well as ensuring community resilience to ongoing environmental and social transitions. Proactive approaches have largely been overlooked, since species expansion can be difficult to predict, and since both research and practice have been focused on mediating conflict. The case-study approach, the framework and the findings of the chapter pave the way for further research in this area, which is important to advance transformative change in how humans and wildlife share space and how these interactions are governed (Fiasco and Massarella 2022).

Finally, the thesis contributes empirical evidence of the plurality of possible interpretations and pathways to coexistence. To identify these interpretations and pathways, a two-step discourse analysis of different views and aspirations of nature and coexistence was conducted, drawing from

qualitative interviews, policy documents and media analysis. The findings provide new perspectives on the ontologies that underpin people's experiences and perceptions of wildlife within multi-use landscapes. Many previous studies on this topic have adopted quantitative approaches, which have limited capacity to answer why and how questions in relation to behaviour and motivations (Rust et al. 2017). The deeper understanding provided by the qualitative approach in this thesis is crucial to explain and address disagreement about conservation objectives, which often derive from tensions relating to identity, sense of place and social belonging (Madden and McQuinn 2014, Redpath et al. 2015). The focus on understanding aspirations also illuminates common priorities and goals, which can inform pre-visioning exercises and other efforts to reconcile different pathways. These efforts are needed to advance recognitional and procedural justice within coexistence and other types of rewilding programmes, thereby increasing stewardship. The findings are presented in chapter four, which also takes advantage of a change in Spanish wolf conservation policy to explore how it was influenced by the identified coexistence discourses: who was heard and who was ignored. This analysis of institutional processes and conduct reveals structural and institutional barriers to effective and inclusive coexistence governance within Spanish as well as European conservation frameworks. It also uncovers how these barriers relate to existing power-knowledge regimes within conservation science and practice. This will be of interest to scholars who study conservation policies and movements, as well as to conservation and development professionals who seek to challenge or improve existing frameworks.

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Chapter two

“They belong here”: Understanding the conditions of human-wolf coexistence in north-western Spain

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In Conservation and Society Special issue:

Exploring Convivial Conservation in Theory and Practice

Abstract

Reintegrating wolves into human-dominated landscapes constitutes a significant conservation challenge. After decades of studying human-wolf interactions through a conflict lens, there is growing recognition that more nuanced perspectives are needed. However, this recognition has hitherto yielded few practical changes, and few have studied what underpins successful coexistence. Here, we show that the disproportionate focus on and resource allocation to conflict within conservation programmes risks undermining existing convivial relationships with wildlife. Using a coexistence lens, we studied human-wolf interactions in Sanabria-La Carballada in Spain; the region has one of the highest densities of wolves in Europe. We explored the underlying social and ecological conditions that have permitted both wolves and people to persist in the area, studied the mutual impacts and how interactions are influenced by broader socio-economic processes. The findings of this novel approach to studying human-wildlife interactions elucidate how areas of functional coexistence have been neglected in policy, leaving them vulnerable to depopulation, low agricultural profitability and the loss of biocultural diversity. When institutions fail to support functional coexistence, we risk losing the knowledge, traditions and trust of those who have sustained Europe's large carnivores, thereby undermining transitions to more convivial human-wildlife interactions in the future.

2.1 Introduction

In Europe, the ongoing trends of rural abandonment (Cimatti et al. 2021), shifting wildlife value orientations (Bruskotter et al. 2017) and increasingly supportive conservation legislation (Cretois et al. 2019), have enabled large carnivore populations to increase in number and recover historic ranges (Chapron et al. 2014). Since protected areas are too few and too small to make up viable habitats (Boitani and Linnell 2015), and because culling is limited by the European Habitat Directive, there are few practical and legal means of preventing large carnivores from expanding into agricultural landscapes. This generates questions about how humans and carnivores could share these spaces in ways that enable mutual flourishing. An increasing number of institutions endorse a coexistence model for European carnivore conservation (López-Bao et al. 2017; Cretois et al. 2019), in which carnivores are integrated within humanised landscapes and protected throughout their range. This model constitutes significant challenges to protecting carnivores, mitigating negative impacts on local communities, and addressing disagreements about conservation management (Mech 2017).

Human perceptions and behaviour often determine carnivore abundance in shared landscapes (Llaneza et al. 2011; Mech 2017). For the coexistence model to work, communities need to be able to adapt to (returning) carnivores and be resilient to the higher degree of unpredictability that is inherent in integrated conservation spaces (Carter and Linnell 2016). It requires human tolerance of co-habitation on a scale that has not existed in recent memory (Boitani and Linnell 2015). However, the state of knowledge of what underpins such adaptive capacities and tolerant attitudes is insufficient (Lozano et al. 2019; Pooley et al. 2020). While decades of research through a conflict lens have yielded substantial knowledge of factors that lead to dysfunctional relationships with wildlife (Redpath et al. 2013; Adams, 2015), little is known about what fosters and perpetuates resilient coexistence (Carter and Linnell 2016). Current interventions are still largely focused on addressing carnivore impacts and intolerant behaviours of particular social groups, often failing to consider underlying issues and social dynamics (Pooley et al. 2017). This may cause biased representations

of human-carnivore interactions, since positive and neutral relationships often exist alongside dysfunctional ones, on both local and national scales (Peterson et al. 2010; Fernández-Gil et al. 2016). In order to advance the debate, we need in-depth studies of the prerequisites of coexistence, and the opportunities and challenges encountered by human and non-human inhabitants in shared spaces.

This research explored the factors underpinning successful coexistence in Sanabria-La Carballeda (S-LC), which has one of the highest densities of wolves in Europe. Applying a coexistence lens, we analysed the main socio-ecological conditions of this region's uninterrupted and relatively harmonious relationship with wolves. This conceptual approach included exploring the influence of broader political-economic trends, both informal and institutional, power dynamics and justice concerns on this relationship. Specifically, the research sought to explore: 1) how coexistence in S-LC has been perpetuated through time; 2) what coexistence in S-LC has meant for wildlife and people; and 3) the main trajectories of change that may influence coexistence in the future. We also explored the possible implications for integrated conservation areas and approaches elsewhere.

The article consists of three parts: the first explores our conceptual approach to human-wildlife coexistence; the second explores coexistence within S-LC; and the third discusses the implications and possible outcomes of the research.

2.2 Conceptual context

Our conceptual approach is underpinned by recent scholarship on coexistence, biocultural diversity, and convivial conservation.

In recent years, coexistence as a concept has gained prominence within the field of human-wildlife interactions (König et al. 2020; Pooley et al. 2020). This focus complements, and partly replaces, the previous focus on human-wildlife conflicts that has been widely critiqued for its tendency to reinforce a human-nature dichotomy, ignore the underlying social elements of disputes, and over-emphasise top-down legal and technical solutions (Peterson et al. 2010; Pooley et al. 2017; Lozano et al. 2019). Within this research, resilient

coexistence is understood as a series of conditions that create “a dynamic but sustainable *state* [italicized by author] in which humans and large carnivores co-adapt to living in shared landscapes where human interactions with carnivores are governed by effective institutions that ensure long-term carnivore population persistence, social legitimacy, and tolerable levels of risk” (Carter and Linnell 2016: 575).

This state does not imply a complete absence of conflicts and trade-offs; although the extent of negative interactions that are deemed acceptable, and for which party (people or carnivores), is still being debated. According to Chapron and López-Bao 2016., coexistence with carnivores is the case so long as they persist in self-sustaining populations, implying that it is primarily about achieving species protection. In line with Pooley et al. 2020., we perceive a difference between protecting biodiversity and promoting coexistence. We favour a conceptualisation of coexistence as a state in which people are able to live equitably and sustainably with wildlife, and where conservation efforts are carried out within the context of wider societal challenges (Redpath et al. 2017; Linnell and Cretois 2018). This is more consistent with current conservation agendas, certainly in Europe, which aim to protect and restore both wild spaces and certain (agri)cultural landscapes (Pretty et al. 2010). The conceptualisation is also more conducive to participatory approaches, which have greater potential to generate local stewardship for nature and wildlife than ‘command and control’ approaches (Bennett et al. 2017).

Mainstreaming this coexistence model is hampered by current sectoral governance and disciplinary silos within academia (Hartel et al. 2019). There is a lack of collaboration between stakeholders whose primary aim is the conservation of certain (often charismatic) species, and those focused on the conservation of landscapes and cultural heritage, yielding separate and sometimes incompatible solutions (Torralba et al. 2018; Fagerholm et al. 2020). The concept of biocultural diversity reconciles these strands. It describes the interactions between people and nature at a given time in a given place, and the cultural and natural aspects arising from these links. Within Europe, where the spheres throughout history have become indivisibly interlaced, pursuing nature conservation separately from its

cultural contexts could in many locations be counterproductive (Pretty et al. 2010; Bridgewater and Rotherham 2019).

Convivial conservation, advocated by Büscher and Fletcher (2019: 289), offers a new and more holistic conservation paradigm. This vision departs from nature-culture dualism and proposes "not setting nature apart but integrating the uses of (non-human) natures into social, cultural, and ecological contexts and systems (i.e., re-embedding)." Since the erosion of cultural and biological diversity is often caused by the same drivers, such as climate change, over-exploitation and homogenisation of landscapes (Henle et al. 2008; Pretty et al. 2010), an integrated approach is necessary to address these underlying challenges. Convivial conservation also engages with people's relationship to their land and past conservation practices, such as (neo)colonial dynamics and dispossession, that are vital to make historical reparations and address injustices within current conservation policy (Büscher and Fletcher 2019).

Coexistence and conflict are thus parts of a constellation of possible human-wildlife interactions and relationships. Both must be understood by examining economic, cultural, political and power dynamics; the agency of humans and non-humans; as well as the social and ecological legacies of past interactions (Redpath et al. 2013; Pooley et al. 2017). The novel contribution of a shift from conflict to a coexistence lens comes from the way it draws attention to conditions and dynamics that could allow both humans and animals to flourish in the context of broader systemic change, rather than merely reducing conflict in a particular place.

2.3 Case study presentation: Wolves and villages in Spain

We explore coexistence through a case study of human-wolf interactions in Spain¹. Wolves are widely recognised as one of the most complex coexistence challenges in the northern hemisphere, particularly for

¹ This constitutes the first part of a larger research project, involving case studies of three areas at different states of coexistence with wolves in Spain, see Pettersson et al 2021.

agricultural communities (Kuijper et al. 2019). It is a highly adaptive apex predator prone to seeking out anthropogenic food sources, and it is considered a flagship species in most European cultures. Exploring what fosters coexistence with such a polemic species could, therefore, inform work with other expanding and/or controversial species.

Due to their continuous presence in Spain, traditional methods of preventing wolf attacks on livestock have been maintained in some places, such as shepherding and the keeping of livestock guardian dogs (LGDs) (Álvarez et al. 2011). During the past 40 years, the Iberian wolf (*Canis lupus signatus*) has recovered and expanded significantly, from 200-500 at its lowest point in the 1970s to currently more than 2,000 today, making it the largest wolf population in western Europe (Blanco and Cortés, 2009; JCyL 2018). The intersection of its large wolf population, the great number of priority habitats, and the persistence of shepherding cultures make Spain highly relevant for the study of coexistence.

The study focussed on a selection of municipalities within the administrative region of S-LC in the Zamora province. It was selected for its exceptional wolf density, stable at approximately 7-10 individuals/100 sq. km since the 1980s; its preserved preventative methods; and its public acclaim as a wolf-watching destination (Vicente et al. 2000; JCyL 2018; Martínez 2019). The area is dominated by a low mountain range (800-1,200 m above msl), which contains the 67,000-ha regional hunting reserve Sierra de la Culebra and the 23,000 ha adjacent Lake Sanabria Natural Park. Both areas were established in the 1970s and have been included within the Natura 2000 network since the 1990s, see Figure 2.1.

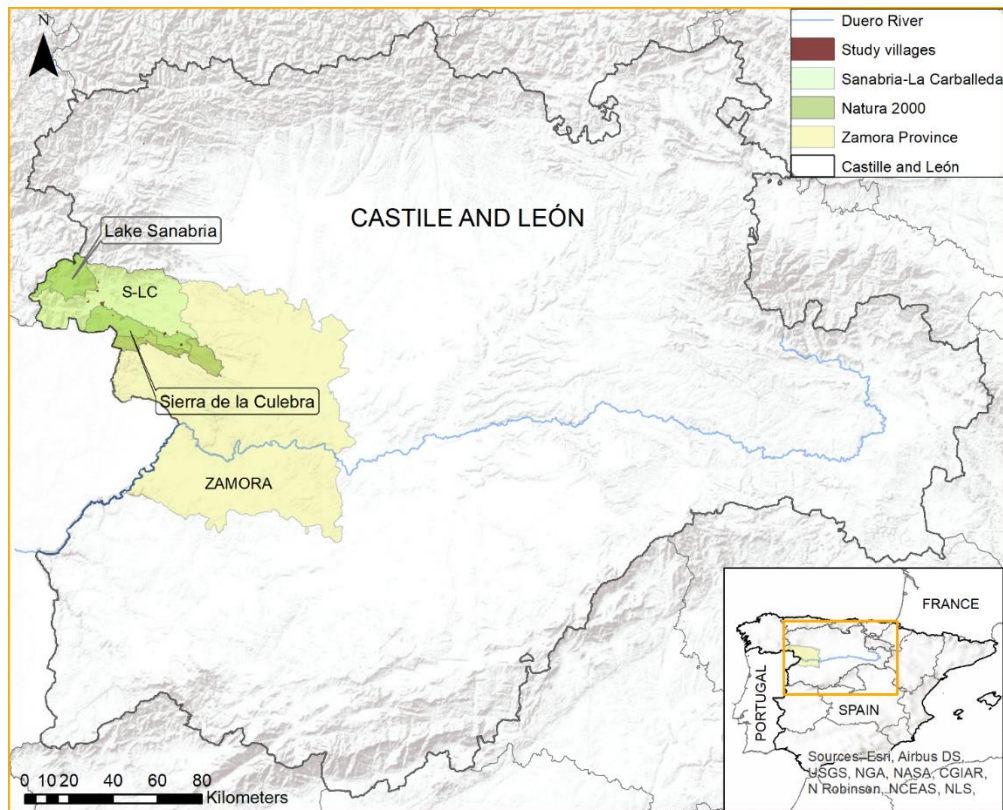


Figure 2.1. Map of Sanabria-La Carballeda (S-LC).

Note: Located within the autonomous community of Castile and León. The villages within or adjacent to where informants were located are marked in brown. North of the Duero River, the wolf is included in Annex V of the Habitat Directive (managed as game species), while in the south it is protected under Annex IV.

The study villages have been characterised by subsistence agriculture, but the sector has decreased significantly over the past 50 years. The Spanish transition towards democracy (1977–1982) and entry into the EU (1984) increased social mobility in the S-LC region. Its marginal soils and harsh climate rendered most farms uncompetitive in a globalised agricultural market, leading to a rural exodus that particularly decimated its shepherd community (Fernández González 2013). In 2018, its population density was less than 5 inhabitants/sq. km and several villages had been completely abandoned (Martínez 2019). The remaining shepherds (sheep and goats) and farmers (cattle) graze their livestock on perennial meadows and in mixed forests and scrub, of which the majority is municipal property (Fernández González 2013; Blanco 2017).

With the farming sector in decline (making up 7.28% of provincial GDP in 2017) (SEPE 2018) and the industrial sector practically non-existent, Zamora is dependent on its service sector. Over the past 30 years, this sector has been enhanced by a growing tourism industry (3.65% of the provincial GDP in 2017) (SEPE 2018), which in S-LC to a significant extent is driven by an interest in the wolf. High wolf density and the favourable topography of La Culebra, with intermingled hills and open spaces that facilitate observation, have made the area emblematic for wolf-watching, in Spain as well as internationally (Martínez 2019).

2.4 Data collection and analysis methods

The case study was conducted through an experience-based assessment of community conditions, which elicits the knowledge of community members to survey factors and processes related to adaptive capacity and resilience (Smit and Wandel 2006). The approach is well suited for the appraisal of the complex systems within which human-carnivore interactions are embedded. Primary sources consisted of observation data and key informant interviews. Secondary data consisted of management plans, newspaper articles and documentaries on the topics of human-wolf interactions, depopulation and rural abandonment in Spain (see tables H1 and H2, Appendix H).

The lead researcher undertook site-based fieldwork from January 2020 to May 2020, which was approved by the Research Ethics Committee at the University of Leeds (AREA 19-018). In order to gain a broad perspective of coexistence in the area, we focused on villages with the presence of tourism, wolves and traditional agriculture. Participant and non-participant observation was continuous and included meetings and events, wolf-watching activities and accompanying farmers and wildlife managers during their daily tasks, which was recorded in a fieldwork diary. Within or connected to the communities, we identified and selected interviewees who were deemed particularly affected by the presence of wolves, or who were involved in species or area management (see Appendix tables H1, Appendix H). In total, 33 semi-structured interviews were carried out in Spanish, tape-recorded and subsequently transcribed. Questions were centred on rural issues and trends, perspectives on human-wildlife interactions and

aspirations for the future. Questions about wolves, unless brought up by the interviewees, were asked at the end in order to understand their primary concerns.

We did not presume to deduce coexistence conditions or their determinants a priori but used a grounded theory-type approach (in line with Mabon et al. 2020), which allows interpretative flexibility during data collection and analysis. We processed primary and secondary data through thematic coding using the NVivo software. A crude coding structure was established according to the research questions, which was expanded through an iterative process with themes that emerged from the data. This inductive approach allowed the data codebook and structure of the results to stem from conditions and trajectories deemed important by the informants themselves (see table H.3, Appendix H).). The findings were then contextualised through the concepts outlined above to empirically support and expand current scholarship on coexistence.

The sample size and scope of the research were limited by time and spatial constraints, and to some degree by language and cultural barriers. Follow-up and comparative studies from other coexistence areas would add nuance to the idiosyncrasies of S-LC and its implications for efforts to achieve coexistence elsewhere.

2.5 Findings

We begin by describing the socio-ecological context of human-wolf interactions in S-LC; followed by an elaboration of four main coexistence conditions that emerged from the data and associated trajectories of change that may impact these conditions. The final section contextualises the results and discusses the wider implications of using a coexistence lens to study and govern human-wildlife interactions.

2.5.1 Trajectory of human-wolf coexistence in S-LC

Similar to other locations in Europe and North America (Bruskotter et al. 2017), people in S-LC have within their lifetime observed the wolf pass from being defined as a pest, both legally and in the public discourse, to an animal that is widely revered and commodified as a tourist attraction. When the countryside of S-LC was still extensively populated and farmed, people's

primary defence against wolf attacks consisted of human presence (many small flocks of sheep demanded constant vigilance from shepherds) and various methods of killing wolves (traps, snares, poison and shooting). However, according to interviewees, the persecution was intermittent and retaliatory rather than a government-organised scheme as in other parts of the country. This contributed to S-LC becoming one of the last wolf bastions in Spain, albeit with declining numbers (Vicente et al. 2000). The trend was reversed in 1970 when the wolf's national status was changed from "vermin" to "game", which regulated the time, number and the approved methods with which wolves could be hunted (Blanco and Cortés, 2009).

Around the same time, Sierra de la Culebra was declared a hunting reserve. The declaration encompassed new policies of forest and wildlife management, including the reintroduction of red deer (*Cervus elaphus*), which had become extinct in the early-1900s. The species boomed thanks to favourable habitat conditions, making La Culebra renowned for some of the highest densities and highest quality of trophies (indicated by antler size) in the country (Vicente et al. 2000). This type of big game hunting has traditionally been dominated by the upper class and political elites, while local hunters were limited to small game such as foxes, grouse and hares. According to administrative staff, these hunting practices converted the reserve into a haven for wolves and ungulates, from where populations expanded into the surrounding region.

While wolf and deer numbers increased, human inhabitants continued to decline. Various informants perceived it as a deliberate scheme by governing institutions, in which they were being 'educated to leave.' The processes of depopulation eroded social cohesion and the communal management of local commons, leaving increasingly isolated farmers to fight what they perceived as a losing battle to maintain traditional landscapes and cultures:

"If it continues along this road, it will disappear. Another thing would be if they [the administration] notice what is happening and start incentivising pastoral farming. But it would have to be an enormous jump, because if there is no generational turnover right now, [...] the

new people who come won't know anything about the land. Because people traditionally take over from someone or have someone who can show them. But if this disappears... Who will come to the village to set up farming when this is all virgin land?" (Shepherd, 2020)

2.5.2 Coexistence conditions

A triangulation of academic publications, observation and informant interviews elucidated four main conditions of wolf persistence in the area:

Favourable habitat

The ecological conditions for the wolf in S-LC have improved since the 1970s, when the habitat for wildlife was severely fragmented (Vicente et al. 2000). A common perception among informants was that wolves in those times survived by predated on livestock. The forest cover has since increased dramatically (both native and planted), and so too have the prey populations (red deer, roe deer, wild boar) (San Miguel et al. 2016). To some extent, this has facilitated a spatial separation of human and wolf activities. For example, informants often credited the booming ungulate populations for decreased livestock losses to wolves over the last decades.

However, the expanding forest cover and rising prey populations were also major causes for concern among local informants. S-LC's farmers must nowadays dedicate a significant proportion of their resources to addressing scrub encroachment on their private and on common lands. They indicated that maintaining these pastures open is essential to prevent wolf attacks, since LGDs can more easily survey the flocks, and since wolves have less shelter to mount their ambush. In addition to scrub, deer and boar are decreasing agricultural yields, damaging vegetable gardens, causing traffic accidents and increasing the prevalence of zoonotic diseases. Interestingly, our observations indicated that local communities were often more exasperated by deer than by wolves. *"It would be better for me if they [the hunters/administration] came here and killed 600 deer and didn't kill any wolves. [...] There are grounds that I had reserved for the cows, and when I get there the deer have already gotten to it,"* (Farmer, 2020).

From an historic perspective, the social and ecological transitions in S-LC have been drastic, rendering the systems practised for millennia nearly obsolete within the span of half a century. When discussing the landscape for wolves and shepherds in the future, several shepherds wryly remarked

that wolves will clearly be “the winners”. A local wolf expert emphasised that the disappearance of shepherds could be detrimental to wolf conservation in the long term, since the buffer zones between human communities and natural areas, traditionally maintained by shepherds, would be decimated. This could increase the risk of negative interactions in the villages, as wildlife would quite literally be “on people's doorstep”. In addition to eroding local knowledge and customs, landscape homogenisation also threatens certain species associated with meadows and pastures, including within Natura 2000 areas (Fuentes et al. 2011). Wildfires have also increased dramatically over the last few decades, partly due to the growing expanse of flammable scrub (JCyL 2014).

Sustained coping mechanisms

The tangible impacts of wolves in S-LC are primarily experienced by rural communities, particularly livestock owners. Among this group, versions of the sentiment “we have always lived with them” were frequently expressed, and we found a general acceptance of wolves as part of the local system, whether cherished or disliked. The various coping mechanisms that have resulted from the convergent evolution of wolves and shepherding have been passed down from generation to generation. Sheep and goats are enclosed at night, accompanied by a shepherd during the daytime, and kept with numerous LGDs. While the efficacy of LGDs to defend cattle was more contested, we found that many cattle farmers kept them regardless, and there was an informal system for matching spare LGD puppies to those who needed them. The number of dogs among our informants ranged from four to 21. For instance, a pack of 18 LGDs had effectively prevented attacks on a flock of 1,400 sheep for as long as the shepherd had been active. However, the viability of LGDs is undermined by national legislation that fails to recognise them as working animals. The law dictates that they should be kept on a leash, and the owners risk prosecution if LGDs attack people or pets. Preventative measures also constitute a significant economic burden and are highly labour intensive, which respondents considered to be one of the main reasons for younger generations’ disinclination to engage in traditional farming.

Irrespective of these issues, there was a broad consensus among locals and civil servants that the measures were effective at limiting wolf attacks in their area. While farmers still lost livestock (in 2017 there were 344 damage claims in the province of Zamora) (JCyL 2018), attacks were mostly opportunistic on animals that were left behind or strayed from the flock (locals called them “oveja del lobo”, meaning the wolf’s sheep). Events in which multiple livestock were killed at the same time were said to be rare.

When locals were asked about their main concerns, the wolf was usually listed after issues such as low agricultural profitability, depopulation, deregulation of social services, lack of infrastructure, low generational turnover, and an inefficient governance system. The relatively low level of antipathy against wolves was reflected in media coverage, where few of the articles about wolf-related grievances within Spain originated from the study area. Instead, as shown by Delibes-Mateos (2020), such articles disproportionately originate from the southern part of the province, where wolves have recently returned. While the cultural legacy of S-LC contained a wealth of frightening stories about wolves (corresponding with those described by Álvarez et al. 2011), the present sentiments among locals were dominated by indifference or delight. Fear, apart from concern on behalf of livestock and pets, was largely absent. In one instance, the lead researcher observed an event in which a wolf became trapped in a villager’s chicken coop while attempting a raid. It later escaped, and the commotion was described in the local newspaper in terms of a “delighted” villager and a “poor, sick little wolf” which “regained freedom” during the night. When asked how he thought wolves should be governed, a shepherd (in 2020) replied: *“Instead of letting them spread, that they lived always in the same area. Here for example, in this area. [...] Here it is possible to live with the wolf, but there are areas where it won’t be possible.”*

These examples illustrate a generalised tolerance and coping capacity of S-LC’s communities, which has evolved over generations. It supports earlier findings from a similar region (Llaneza et al. 2012), which highlighted the importance of long periods of cohabitation to establish harmonious human-wolf relationships. This ability to live and produce alongside or despite wolves is gaining repute as proof that coexistence is possible. A growing

number of documentaries, newspaper articles, and campaigns have centred on a group of S-LC shepherds and farmers considered emblematic for their preventative measures, such as the keeping of LGDs. Additionally, we identified a widespread pride among locals of this expertise of the area's shepherds. However, current agricultural policies in Spain are incentivising cattle over sheep and intensive agriculture over traditional pastoral systems (San Miguel et al. 2016). Cattle require less protection from wolves since they are larger and more easily fenced, and are consequently becoming increasingly dominant in the sector, while sheep and shepherds are declining. Cattle raising provides more time for farmers to diversify their income, which they perceived as essential in a sector where, after decades of unfavourable market conditions, the economic margins are very narrow. However, the transition to cattle is an emerging coexistence challenge due to the vulnerability of young calves. Their growing numbers in combination with decreased vigilance have now become the main source of wolf attacks and associated disputes in S-LC (JCyL 2018).

Managing wolves as game and compensating damages

In the northern half of Castile and León (see Figure 2.1), the wolf is listed in Annex V of the Habitat Directive and managed as a game species. A range of stakeholders cited this partial protection as essential for coexistence in general, particularly in S-LC. The consistently high density of wolves in the last decades was considered a proof of concept, often contrasted with the poor conservation status of wolves in areas where they are strictly protected by Annex IV. This includes Andalusia, where wolves are now believed to be extinct; and Portugal, where poaching is a significant issue (although there is limited evidence that legal hunting decreases poaching, see Blanco 2017). While wolves still die of unnatural causes in S-LC, it is in low numbers. In 2017, the official figure was 34, mainly from traffic accidents (JCyL 2018). In contrast with complete protection, the regular hunting of wolves gave many locals a sense that they were “under control”, something they considered essential for all wildlife in order to prevent overpopulation and disease. The 2019-2022 hunting plan in Zamora province approved the hunting of 29 specimens per season from its estimated 30 wolf packs, of which the majority are to be hunted in La Culebra (JCyL 2019). For both wolves and

deer, the hunting fees are substantial. The wolf permits in La Culebra are auctioned with a starting bid of EUR 3,600 (plus an additional EUR 2,500 in fees and 21% tax) (JCyL 2020). The income from hunting (around EUR 120,000 per year in recent years, according to the reserve administration) is divided proportionally among the 12 municipalities which own 70% of its area amongst themselves. Various locals cited the importance of this income for the maintenance of municipal infrastructure and other necessities.

As part of the management plan, the regional government is also responsible for compensating for direct damage from wolves to livestock within hunting reserves. Outside of the reserves, shepherds and farmers are compensated only if they have specific insurance, for which the deductible is covered by the government in case of attacks. In either case, there was wide consensus that submission and payment of claims were incredibly cumbersome and slow. Claims are only granted if attacks can be proven, which is often impossible since carrion-consuming species are abundant in the area.

"Yes, I have insurance. But it doesn't make much sense, what it costs me in fees means that it doesn't compensate for the cost of the livestock if it gets killed. [...] First I have to find it. And how am I then to prove to the Junta [the regional government] that it was the wolf who killed my foal? They will tell me "bad luck, amigo". [...] They won't pay you. And if they do it won't be what it is worth, it will be nothing."
(Cattle and horse farmer, 2020)

"But what is certain is that to the south of the river Duero, because it [the wolf] is a protected species there, damages are paid out faster. [...] But because the wolf to the north of the river Duero is a game species, it is possible to hunt it, well, I don't know, for some reason the payments are delayed. And people become angry with all the rights in the world." (Civil servant, 2020)

According to official statistics, the numbers of registered and compensated damages north of the Duero river have declined in recent years, particularly for sheep, while remaining stable for cattle (JCyL 2018). However, our findings indicate that due to the ineffective bureaucracy, many farmers

abstain from reporting anything but major losses, resulting in an official underestimation of damages.

Notwithstanding its historic role in saving the species, wolf hunting is today a deeply polemic topic in Spain, and we perceived growing support for the strict protection of wolves. This was evident in the media and campaigns from informal groups, political parties, and NGOs. In S-LC, this view was enhanced by the growing importance of wolf tourism. Views diverged within and between stakeholder groups about the role of hunting in sustaining coexistence in the future, and whether it could be compatible with wolf tourism. Uncertainty over the impact of culling on pack structure, and its efficacy in preventing livestock damages (see Eklund et al. 2017), contributes to this division, noticeable in how certain facts from scientific papers and reports were cherry-picked to support particular standpoints. Further exacerbating the situation is a lack of transparency in how and why decisions regarding wolves are made by the authorities. We found a systemic distrust of politicians and the authorities, on all levels, throughout the studied communities. The regional government has been prosecuted on various occasions for insufficient scientific grounds justifying their hunting quotas, leading to temporary hunting bans, the most recent in 2019 (Blanco 2017; Camazón 2020). Simultaneously, hunters perceived increasing social pressure and aggression from animal-rights groups, which they believed was partially to blame for the low generational turnover within the hunting sector. There is now mounting pressure to harmonize wolf management in Spain by declaring it strictly protected throughout the country (MITECO 2020). Thus, the future of hunting in S-LC, and its broader implications for wolves, is uncertain.

Tourism

In recent decades, the ability to commodify the wolf has become an important justification for coexistence. The year 2015 saw the inauguration of Iberian Wolf Centre in Sanabria, a 21 ha interpretation centre, and a part of a socio-economic revitalisation project linked to the regional Wolf Conservation and Management Plan (<https://centrodellobo.es/>). The centre, with its two packs of captive-bred wolves, has cemented the status of the S-

LC as the “Land of the Wolf”. Wolf imagery is readily displayed throughout the area, on touristic information material and on various paraphernalia sold in village shops. There are 12 wolf-watching businesses that completely or partly base their operations in La Culebra, four with local offices, and an estimated 3,100 visits in 2017 (Martínez 2019; Lora Bavo and Villar Lama 2020). According to a study from La Culebra in 2012, wolf tourists represented almost half of the overnight stays in rural accommodations (Blanco 2017). Tourism in S-LC is otherwise limited to the summer months. Wolf observation, a year-round activity, has therefore become important to somewhat mitigate this seasonality. The economic impact of the sector was widely acknowledged, and a majority of the interviewed mayors saw tourism in general, and wolf watching in particular, as essential to ensure a future for their municipality.

Concomitant with the growing demand for nature tourism across Europe, the sector in Spain will likely keep expanding and attracting tourists to rural areas where bears, lynx and wolves may be observed (MAPAMA 2017). The increasing volume is a challenge for local and regional administrations. They do not receive any direct income from tourism (there are no park fees), but are responsible for providing and maintaining infrastructure, regulating businesses and preventing the negative impact on wildlife. Growth notwithstanding, wolf tourism still represents a small percentage of the local economy, and one that is dependent on outside patronage rather than the communities' own production. As became evident during the COVID-19 pandemic (which broke out during the fieldwork period, halting all tourism activities), the industry is fickle and prone to sudden changes in demand. Wolf tourism is also unfeasible in most areas outside of the hunting reserve, and Spain in general, since topography, forests and other factors make wolf-watching difficult and unpredictable.

2.6 Fostering coexistence and conviviality – What can S-LC teach us?

In order to understand coexistence in S-LC, we return to the elements outlined by Carter and Linnell 2016.: social legitimacy, tolerable levels of

risk, mutual adaptation, carnivore population persistence, and effective institutions.

What characterises coexistence in S-LC was not an absence of disputes. Some locals dislike and find wolves problematic, and a minority react accordingly (for instance by publicly voicing anti-wolf opinions).

Nevertheless, for the most part, wolves are considered a legitimate element of S-LC's fauna. While opinions diverged about acceptable population size and impact, we did not encounter anyone who advocated for the extinction of wolves, or who would not tolerate some level of wolf-related inconvenience, which is consistent with earlier findings from the region (Martínez 2019). It contrasts findings from elsewhere in Europe and North America where wolves are perceived as the main concern of rural inhabitants, and where tolerance to wolves decreased with proximity to the nearest wolf habitat (Blanco 2017; Bruskotter et al. 2017). The relatively high tolerance of S-LC's inhabitants, and their ingenuity to protect their livestock, has been important for the recovery of wolves across the Iberian Peninsula, since the area has constituted a buffer zone from which wolves could reclaim territory. People's tolerance is likely a product of the uninterrupted process of adaptation to sharing space. People who decide to live and produce in S-LC are aware of the wolf as a local idiosyncrasy and can readily learn about efficient coping mechanisms from senior shepherds. Similar findings were made in Albania, where locals attributed the relatively few wolf attacks on livestock to inexperience or poor shepherding (Trajce 2017). Since wolves are expanding across Europe (Cimatti et al. 2021), these examples of convivial practices and attitudes, and the embodied knowledge of these stakeholders, are crucial to informing conservation policy in the coming decades (Carter and Linnell 2016). That deer seem more contested and troublesome than wolves in S-LC supports theories that (re)introduced species tend to generate more disputes than those with permanent presence (Linnell and Cretois 2018). However, we encourage further exploration to ascertain how widespread this perception is in S-LC. The importance of habit to the legitimacy of a species is a challenge to conservation. It could mean that the return of many large-bodied mammals will be accompanied by long periods of turbulence and dispute before more

convivial relationships can be established. It raises the question of how the process of legitimising and becoming accustomed to these species can be accelerated, including the development of efficient and locally appropriate coping mechanisms.

Our findings align with Von Essen and Allen's (2018), in that rural inhabitants usually recognise that modernisation is unavoidable and tolerate associated changes, as long as they are gradual and can be unified with major elements of the prior status quo. We thus contend that effective institutions, capable of working across scales and connecting social and ecological issues, are essential in fostering and perpetuating people's willingness and ability to coexist with wildlife. They must address the disparity in living conditions between urban and rural people, perpetuated by unequal access to social services, subsidies that incentivise efficiency over socio-environmental indicators, and the decoupling of consumers from producers (as detailed by Leal Filho et al. 2016; Navarro and López-Bao, 2018).

In S-LC, informants agreed that it was not the wolves themselves that were the problem, but how they and their rural surroundings were governed. Farmers and villagers considered the administration to be ignorant of their reality, unresponsive to their needs, and felt excluded from decision-making processes. This sentiment was exacerbated by the poor performance of damage compensations schemes, mirroring earlier findings of the inherent problems with ex-post payment schemes (see Nyhus 2016). The disinclination within both Spanish and European policy to support functional coexistence relationships exacerbated the vulnerability of communities such as S-LC to surrounding challenges. It also undermined habitat protection and public accessibility within Natura 2000 areas through increasing scrub encroachment, wildfires, and crumbling infrastructure (Fuentes et al. 2011). Ineffective governance is thereby neglecting the very conditions that have fostered conviviality in S-LC by perpetuating low generational turnover, depopulation and urban-rural polarisation. As shown elsewhere, wolves can easily become symbols for such issues, particularly when locals feel disempowered (Peterson et al. 2010; Madden and McQuinn 2014).

The situation in S-LC reflects a policy reality that remains biased towards conflict rather than incentivising and enhancing coexistence, for example, by legally and economically supporting guardian dogs and initiatives that stimulate markets for local produce. Another example of this phenomenon can be observed in Idaho, which recently passed a law that calls for the killing 90% of the state's wolves, with the stated rationale to appease angry hunters and farmers (Oppie 2021). Analysing the situation through a coexistence lens could have elucidated alternative relationships and pathways. One example is Lava Lake Farm², which raises free-roaming lamb in an area with wolves and other large carnivores, with minimal losses.

Given burgeoning global restoration agendas (e.g., UN decade on ecosystem restoration³), there is an increasing urgency to explore and build on existing ways of leading convivial lives with "problematic" species such as the wolf. If areas that are emblematic of wolf coexistence are overlooked and their traditions and cultures rendered obsolete, it may reinforce the image of the wolf as "the beast of waste and desolation"⁴ and further intimidate areas that are expecting their return.

2.6.1 Governing for sustainable coexistence

Our study supports earlier findings that large carnivore conservation cannot be decoupled from other aspects of rural policy, and that coexistence measures should be mainstreamed within wider rural development programmes (Linnell and Cretois 2018). Present disputes in a system may indicate where to direct efforts and serve as a catalyst for positive change (Madden and McQuinn 2014). Our data indicate that most disputes in S-LC spring from the unequal distribution of responsibilities and benefits of wolf conservation. Local communities, particularly farmers and shepherds, face the practicalities of coexistence, while a different set of stakeholders (e.g. hunters, tourists and wolf-related businesses), who often live elsewhere, are

² <https://www.lavalakelamb.com/lava-lake-story/conservation/>

³ Phrased about wolves by Theodore Roosevelt in "Hunting the Grisly and Other Sketches" in 1902/

⁴ <https://www.decadeonrestoration.org>

the predominant beneficiaries. Although farmers and shepherds indirectly benefited from increased economic turnover and service provision associated with hunting and tourism, they received no direct benefits that could alleviate their precarious economic status, or the increased workload required to prevent wolf attacks. As a local shepherd put it in 2020.: *"The ones of us who live in wolf territory have significantly less quality of life than those who don't. So you will always lose, always. [...] Even if you are economically compensated for all the costs you have from the wolf, even then you will lose."*

This illustrates a generalised conundrum within conservation; that actors who are directly dependent on and living with natural resources tend to be the most negatively affected by wildlife, least enriched by species protection, and most targeted by interventions that strive to change behaviours and livelihoods to meet biodiversity targets (Büscher and Fletcher 2019; Jordan et al. 2020). If left unaddressed, this disparity will keep undermining coexistence and the perceived legitimacy of conservation policy. The negotiation of the European Green New Deal and the revised Common Agricultural Policy offers a window to adjust funding mechanisms according to more just and environmentally sustainable principles. The mechanisms (that have been reviewed elsewhere, see Marsden et al. 2016; Navarro and López-Bao 2018) must be flexible in order to address idiosyncratic local needs—which could range from the provision of infrastructure (barns, fences, producer-consumer networks), services (scrub removal, communal shepherding schemes) or support with bureaucratic and legal issues (land rights and application procedures). One approach that has been successfully applied to identify these needs and which builds on local embodied knowledge is Participatory Action Research, which is based on intimate collaboration between researchers and communities (Milich et al. 2020). Local participation in the establishment of conservation priorities, which was accomplished by a regional mediation initiative within our study area⁵, could

⁵ <http://www.grupocampogrande.org/>

counter authoritarian and alienating policies and improve local stewardship of wildlife (Redpath et al. 2017; Büscher and Fletcher 2019).

The effects of such policy interventions may result in a shift away from damage payments, due to their long-term economic unviability, particularly as carnivores keep expanding, and failure to incentivise good practice (Nyhus 2016). An alternative may be ex-ante payments for those residing in a carnivore area, similar to the support to farmers in certain marginal areas. One such scheme for large carnivores has been rolled out with some promising results in Sweden (see Persson et al. 2015). Another interesting proposition is a Conservation Basic Income, combining the social benefits of Universal Basic Income with the focus on environmental protection of the Payment for Ecosystem Services' programme (Fletcher and Büscher 2020). However, many questions remain for both of these schemes before they can be applied on a larger scale, for instance concerning the delineation of territory, funding, and legitimacy. These queries notwithstanding, we believe these schemes could contribute to a more hopeful and equitable conservation policy by incentivising convivial practices and ensuring that areas with functioning coexistence prosper in the long term.

2.6.2 Population management of a flagship species

The peculiar status of S-LC as a destination for both observing and hunting wolves created an interesting dynamic and gave rise to incongruent views about the area's past and future coexistence conditions. It is illustrative of a global trend in which increasingly mutualist animal ethics clash with local, often more utilitarian views of wildlife (such as trophy hunting), and the practicalities of wildlife management in marginal(ised) landscapes (Bruskotter et al. 2017; Pooley et al. 2017). Given the flagship status of large carnivores and the reoccurring lawsuits by NGOs and civil society, it seems unlikely that S-LC's approach, based on culling and recreational hunting as a means of control, would be accepted on a larger scale (Blanco 2017). A complete ban on lethal control seems equally unfeasible, since the nature of coexistence means that the dynamics that would regulate wolf populations in a completely 'natural' system are significantly altered. As noted by Mech 2017., wolves can and will adapt to almost any type of habitat as long as

there are viable sources of food, whether anthropogenic or wild. Since wolves have high reproductive potential, they will continue to expand their ranges in the absence of threats, increasing the pressure on domestic livestock and moving closer to suburbs and cities. In policy advice for the European AGRI Committee 2018., it is therefore acknowledged that some level of lethal control will always be needed, and Boitani and Linnell (2015: 67) further note that in Europe, “[...] human influence on all trophic levels is pervasive, legitimate, necessary and often even desirable”.

However, even an inherently pragmatic position on control, for instance, only targeting individual animals that cause damage, is likely to be controversial. Decisions about where and when wolves should be culled, legally hunted, or protected will require transparent and participatory approaches in order to successfully balance the goals of carnivore conservation with the goals of preserving rural culture, population and production in marginal areas (Linnell and Cretois 2018).

2.7. Conclusion

Studying the histories and conditions of human-wildlife relationships helps us identify where and when different animals are perceived to belong or be out of place (Pooley et al. 2017). In this research, we have illustrated that the use of a coexistence lens to study human-wildlife interactions is instrumental to identify areas from which to seek knowledge and inspiration on how to promote convivial conservation. In the case of S-LC, we found a clear manifestation of functioning coexistence, but also threats to the stability of this state. Our work with impacted communities indicated that boosting sustainable farming practices could ensure both wolf conservation and the preservation of local cultures, thereby enhancing the area’s reputation as a successful coexistence model.

Where the conflict lens has repeatedly produced the same apolitical and technical solutions (i.e., preventative measures, efforts to change attitudes and compensation payments), our approach based on promoting 'bright spots' and biocultural diversity can help bridge disciplinary silos and accelerate transformative changes in conservation policy (Pretty et al. 2010;

Bennett et al. 2015). A shift in policy orientation, from reducing conservation conflict to enhancing coexistence, would mean dedicating more resources to addressing underlying socio-ecological issues and promoting resilience of convivial lifestyles and behaviours, embracing the plurality of ways in which they can be manifested. This aligns with Büscher and Fletcher's (2019: 288) principles that conservation should go beyond preserving only non-human nature, and that it should be conducted within the "broader amalgam of "living landscapes" that do long-term socio-ecological justice to humans and non-humans." By ensuring dignity, inclusivity and supporting communities to develop with global transitions, it is possible to preserve Europe's vibrant and entangled biocultural diversity, while shifting towards more harmonious human-nature interactions. There are undoubtedly more positive examples which we could build on—we just need to look for them.

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Chapter three

Welcoming wolves? Governing the return of large carnivores in traditional pastoral landscapes.

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In *Frontiers in Conservation Science Research Topic: Understanding Coexistence with Wildlife*

Abstract

Wolf populations are recovering across Europe and readily recolonise most areas where humans allow their presence. Reintegrating wolves in human-dominated landscapes is a major challenge, particularly in places where memories and experience of coexistence have been lost. Despite the observed expansion trends, little has been done to prepare communities for the return of these apex predators, or to understand what fosters and perpetuates coexistence. In this study, we present a theoretical framework for resilient coexistence based on four conditions: Effective institutions, large carnivore persistence, social legitimacy and low levels of risk and vulnerability, nested within the social-ecological systems (SES) concept. To empirically show how the conditions can be manifested and interconnected, and how this knowledge could be used to improve local coexistence capacities, the framework is applied in a case study of human–wolf relations in Spain. We examined three traditionally pastoral landscapes at different states of cohabitation with wolves: uninterrupted presence, recent recolonisation and imminent return. We found that both the perceptions of wolves and the capacity to coexist with them diverged across these states, and that this was largely determined by a diversity of vulnerabilities that have not been recognized or addressed within current management regimes, such as economic precarity and weak legitimacy for governing institutions. Our results illustrate the importance of working in close contact with communities to understand local needs and enhance adaptive capacities in the face of rural transitions, beyond those directly related to wolves. The framework complements emerging tools for coexistence developed by researchers and practitioners, which offer guidance on the process of situational analysis, planning and resource allocation needed to balance large carnivore conservation with local livelihoods.

3.1 Introduction

Current plans for socio-ecological transitions, such as the EU biodiversity strategy (The European Commission., 2020) and the UN Decade on Ecosystem Restoration (UNEP., 2019), call for new ways of thinking about how humans and wildlife might share space. In Europe, expanding large carnivore populations (Chapron et al., 2014; Cimatti et al., 2021), rural land abandonment (Bürgi et al., 2017) and a growing rewilding movement (Ceausu et al., 2015) have brought Human-carnivore interactions (HCI) into focus, meaning the multifaceted interactions between humans and large carnivores. In recent decades, European conservation policies have supported the integration of large carnivores within human-dominated landscapes (Boitani and Linnell, 2015; Cretois et al., 2019). As carnivore populations increase, institutions across the continent face the challenges of (re)integrating these species, balancing the aims of biodiversity conservation, livelihood protection and the welfare of carnivores and domestic animals (Redpath et al., 2013; van Eeden et al., 2018).

Large carnivores often become symbols of incompatible human-nature ontologies, primarily between those who uphold traditional rural practices, and those with urban lifestyles (Pooley et al., 2017; Ericsson et al., 2018). The negative impacts of large carnivores are disproportionately experienced in rural communities, some of whom are vulnerable due to market globalization, rural depopulation and inequitable agricultural policies (Leal Filho et al., 2017; Pe'er and Lakner, 2020). Growing carnivore populations will result in increased overlap between these communities and carnivores (Milanesi et al., 2017; Hinojosa et al., 2018). However, little has been done to proactively enhance their ability to adapt to this. Moreover, while research has revealed the causes and components of dysfunctional HCIs, mostly through the lens of human-wildlife conflicts, there are fewer studies on what constitutes functioning human-carnivore coexistence (Lozano et al., 2019; Pooley et al., 2020). This could give the impression that conflict is a dominant and inevitable outcome of living with large carnivores, rather than one of multiple possible and often simultaneous relations (Peterson et al., 2010; Rode et al., 2021). Identification and amplification of functioning HCIs could greatly benefit conservation agendas, by providing effective and optimistic messages and examples (Madden, 2004; Bennett et al., 2015).

In response to calls for in-depth research on coexistence

(Carter and Linnell, 2016; Pooley et al., 2020), we explore the conditions that influence human–wolf relations in traditional pastoral landscapes, focusing on the factors that may enable coexistence. We present a theoretical framework of resilient coexistence, and apply it to human–wolf relations in three rural communities in Spain that are at different states of coexistence with wolves: uninterrupted presence, recent recolonisation and imminent return. Through key informant interviews and participant observation, we explore how coexistence conditions are manifested and interconnected at each location, and how capacities to coexist are influenced by socio-ecological trends. Finally, we explore the associated lessons and aspirations for carnivore governance in the future.

3.2 Theoretical framework

This research draws on recent advances in the study of human–wildlife interactions, which aim to understand the factors that shape coexistence in multi-functional landscapes (Peterson et al., 2010; Lozano et al., 2019; Pooley et al., 2020). In the case of large carnivores, the desired states of HCI are usually described as “resilient coexistence” (Carter and Linnell, 2016, p. 575), in which both humans and carnivores flourish without substantially compromising the means of the other, and where effective and legitimate institutions have the capacity to address problems and disputes as they arise (Chapron and López-Bao, 2016; Hovardas and Marsden, 2018).

What makes coexistence resilient is location specific and influenced by various social and ecological processes, which improve or undermine communities' coexistence capacity (Lischka et al., 2018; Lozano et al., 2019). In order to facilitate the analysis of coexistence in different contexts, we theoretically expand on each condition necessary for resilient coexistence: effective institutions, large carnivore persistence, social legitimacy and tolerable levels of risk (Carter and Linnell, 2016), and nest them within the social-ecological systems concept (SES; see Figure 3.1). The framework draws on insights from multiple fields, including resilience thinking, anthropology, ecology and human–wildlife interactions, which are necessary to understand the links between human society, the environment and large carnivores (Hartel et al., 2019).

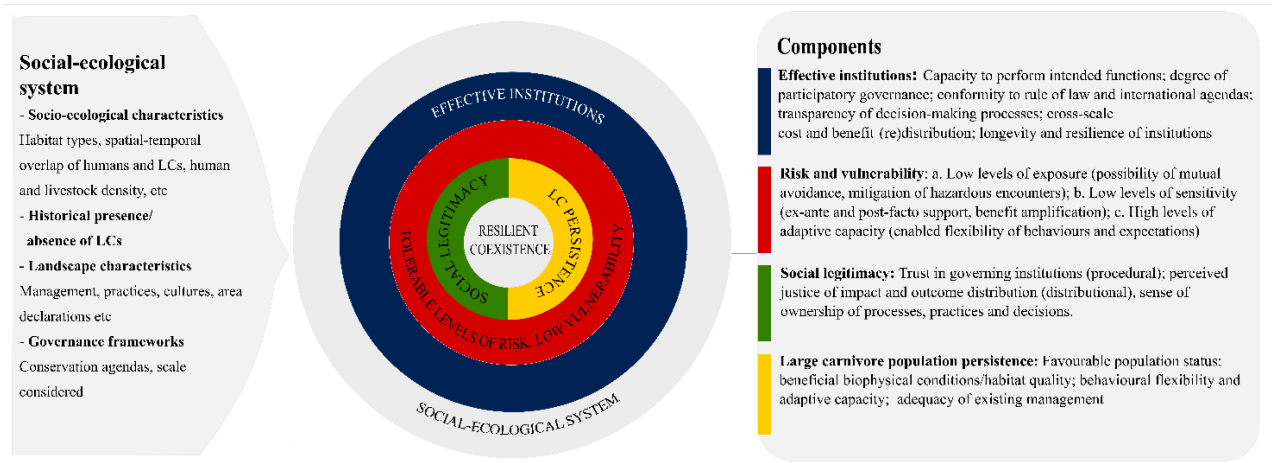


Figure 3.1. Schematic illustration of the conditions of resilient coexistence with large carnivores (LCs) within a given system.

Note: Synergies within the model can work in both directions: Institutions can mediate the influence of social and ecological processes on human and wildlife communities and ensure that human-LC interactions are not undermining the integrity of the ecological and cultural system.

3.2.1 Social-ecological systems and biocultural diversity

The SES approach understands people, communities, economies, societies and cultures as embedded parts of the biosphere. It takes into account the spatial, temporal, political and organizational processes (including considerations of power and justice) that influence human and animal behaviours and how they shape and are shaped by the system (Folke et al., 2016; Lischka et al., 2018). For coexistence in traditional landscapes, the overlap of human and large carnivore activities, the historical presence, absence and governance of the species, and the characteristics of the landscape are especially important considerations (Linnell and Cretois, 2018). Traditional landscapes are a product of the connection between people and place, which form part of local identities, memory and heritage (Pretty et al., 2010). It is the setting for an area's biocultural diversity; a coevolving convergence of historical and ongoing environmental and social processes and its resulting flora, fauna and cultural expression (Pretty et al., 2010; Agnoletti and Rotherham, 2015). Combining these perspectives allows us to view nature and culture not as separate, but as coevolving entities

whose interactions continuously shape the conditions of coexistence (Pooley et al., 2017; Gavin et al., 2018).

3.2.2 Effective institutions

We define institutions as the bodies and/or systems of formal or informal rules that structure social interactions, i.e., all customs and practices, organizations and agencies, and policies and laws (Hodgson, 2006; Decker et al., 2016). Institutions must be attuned to SES dynamics if they are to enable humans and carnivores to co-adapt, such as in response to changed cultural values of nature. They must also be accountable across multiple scales to ensure public trust and stewardship, from international agendas (such as the Habitat Directive) to local communities (Trouwborst, 2010; Decker et al., 2016). Institutions can facilitate or constrain the behaviours and activities that underpin HCIs in many ways, for example by implementing conservation laws and habitat management actions (e.g., protecting and restoring habitat conditions); providing incentives (e.g., conservation payments); support (e.g., information sharing and provision of infrastructure); and by impacting frames of thought (through regulation, education and staking out future visions) (Carter and Linnell, 2016; Milanese et al., 2017). By appropriately combining these measures, institutions can have an instrumental role in enhancing the other conditions of the framework (see Figure 3.1). Effectiveness refers to the capacity of formal or informal governing bodies to carry out decision-making and interventions in a way that is adequate (meeting social and ecological needs) and just (distributive and/or procedural) so that benefits of coexistence are amplified and drawbacks mitigated for both humans and carnivores (Walker, 2009; Lockwood, 2010).

3.2.3 Large carnivore population persistence

Population persistence implies that local conditions enable the long-term presence of self-sustaining large carnivore populations (Trouwborst, 2014; Chapron and López-Bao, 2016). Specifically, this means that the risk of local extinction of the species is kept low over long time scales, which can be achieved through favourable habitat conditions and connectivity,

abundant prey populations and genetic diversity within the populations (Brook et al., 2000; Lacy, 2018). Ultimately, the size and range of large carnivore populations are constrained by humans, influenced by what risk levels are acceptable to people in a particular place (Bruskotter et al., 2017; Mech, 2017). This is impacted by heterogeneous ethical and moral considerations relating to rights, responsibilities and costs, where social power dynamics influence which viewpoint gains prominence and which scale is considered (i.e., the local, regional, or national state of populations; Wilhere, 2008; Vucetich et al., 2018).

3.2.4 Social legitimacy

The presence of large carnivores strikes at the heart of relationships between conservation, development and justice. Achieving a state of coexistence that is legitimate to as many stakeholders as possible is therefore essential in order to ensure its resilience (Jacobsen and Linnell, 2016; Ceașu et al., 2018). Social legitimacy refers to both input legitimacy and output legitimacy. Input legitimacy, connected to procedural justice, is based on judgements about whether decision-making bodies and processes are morally fair, transparent and appropriate for affected parties. Output legitimacy refers to the quality and equity of policy outcomes, and the extent to which an institution delivers its stated aims (Walker, 2009; Bennett et al., 2019). Governing bodies gain and maintain the social “license to operate” afforded by legitimacy by winning the trust and respect of constituents, and by relating policies to local priorities and values (Jepson, 2005). Public trust in governing institutions can enable public acceptance of expanding large carnivore ranges and populations, notwithstanding the potential risks (Jepson, 2016; Treves et al., 2017).

3.2.5 Tolerable levels of risk - low levels of community vulnerability

The impacts of large carnivores and humans on each other depend on their use of local resources, their spatial and temporal overlap and their ability to withstand stressors (Treves and Karanth, 2003; Redpath et al., 2015). Resilient coexistence does not imply a risk-free state. Rather, the risks are mitigated so that they become “tolerable” (Carter and Linnell, 2016, p. 575),

although this is not well-understood or contextualized. It is not only the risk to livelihoods that affects people's willingness to coexist, but also whether the risk is perceived as inherent within the system or imposed, and by whom (Redpath et al., 2017; von Essen and Allen, 2019). Of equal importance is subjective judgement about how coexistence may affect well-being, way of life, identity and community (Madden, 2004; Pooley et al., 2017). Within the framework, we therefore expand this condition to consider vulnerability of coexistence communities. Vulnerability is a function of exposure, sensitivity and adaptive capacity to change and shocks within a system. Together they illuminate the probability and severity of an event, and the ability of the impacted party to cope (Adger, 2006; Nelson et al., 2007). This contributes to a more holistic understanding of the long-term well-being of both people and large carnivores in an area, beyond simply an assessment of livestock and wolf mortality or economic impacts.

3.2.5.1 Exposure

Large carnivores in Europe predominantly persist outside of protected areas (Chapron et al., 2014), which increases the probability of interactions with humans (Crespin and Simonetti, 2018; Rode et al., 2021). Reducing negative interactions is possible by spatially or temporally segregating human and large carnivore activities (Bruskotter et al., 2017; Reinhardt et al., 2019). To achieve this separation, large carnivore behaviour can be influenced by ensuring favourable habitat conditions in areas away from human settlements, and using physical deterrents to protect livestock, such as fences and guardian dogs (Eklund et al., 2017; van Eeden et al., 2018). Human behaviour can be influenced by restricting activities, e.g., grazing of livestock in certain areas (regulation and zoning), social and economic incentives and information campaigns (Penteriani et al., 2016; Linnell and Cretois, 2018).

3.2.5.2 Sensitivity

Sensitivity refers to the degree to which a community is affected by perturbations (Adger, 2006), such as the return of a species. Low sensitivity implies that the adverse impacts that large carnivores and humans have on each other are moderated to a level at which the identity, function and feedbacks of the system can persist, while retaining flexibility to develop (Nelson et al., 2007). Approaches to reduce sensitivity are usually based on economic instruments. They can be important to increase perceived distributive justice, since they enable the (re)distribution of resources to those whose livelihoods are directly affected by large carnivore conservation (Hovardas et al., 2017; Kojola et al., 2018). Instruments can consist of compensation and insurance schemes (ex post facto), payment based on risk (ex-ante), or incentives for conservation outcomes (e.g., payment for presence) (Ravenelle and Nyhus, 2017; Linnell and Cretois, 2018). Their success is contingent on cost-effective and viable verification (of carnivore range or predation), fair and timely payments, incentives for damage prevention and financial sustainability (Wilson-holt and Steele, 2019).

3.2.5.3 Adaptive capacity

Adaptation refers to the ability of individuals or groups of humans or carnivores to adjust their behaviour to better withstand changing conditions or hazards (Smit and Wandel, 2006). Large carnivores exhibit several behavioral and spatial-temporal adaptations to anthropic environments (Chapron et al., 2014; Carter and Linnell, 2016). Some decrease risk of negative interactions, such as nocturnal or crepuscular activity patterns (Gaynor et al., 2018), while others increase predation on livestock or exploitation of urban food sources (Milanesi et al., 2017; Evans et al., 2018). By understanding and addressing population and individual behaviour, wildlife managers can decrease risks to both humans and carnivores (Linnell and Cretois, 2018). Human adaptive capacity is an emergent property connected to social and psychological characteristics, as well as the physical and economic elements that impact willingness and ability to adjust

behaviour (Nelson et al., 2007; Dorresteijn et al., 2016). For cultures to persist, communities need to be able to build on traditional knowledge while adjusting and forming new expectations that enable well-being under social and environmental transitions (Smit and Wandel, 2006; Pretty et al., 2010). With regards to large carnivores, physical and psychological barriers that inhibit adaptation are often present, such as certain farming practices or perceptions about large carnivores and what they represent. By identifying and addressing these barriers, it is possible to influence people's expectations and narratives of HCI and local landscapes (Hovardas et al., 2017).

3.3 Materials and methods

3.3.1 Case study rationale

We operationalized the framework through a case study on human–wolf relations in three rural areas of Spain. The areas are characterized by traditional land-use systems, specifically extensive rearing of sheep and/or goats (small-scale, low input family farms), which are experiencing changes in the presence or impacts of wolves. The wolf is a highly adaptive apex predator, which may attack livestock and pets, and can be perceived by hunters to compete for game (Linnell and Cretois, 2018). Wolves are moreover considered a flagship species, invoking opinions, feelings and meanings among those who live alongside them as well as those who don't (Mech, 2017; Kuijper et al., 2019). Exploring the conditions of coexistence with such a multi-faceted species in traditional landscapes could thereby inform work with other species often involved in disputes over wildlife.

We selected three states of wolf presence since the 1970s, when the population was at its lowest point. Location A has had an uninterrupted experience of cohabitation with wolves; location B has experienced their recent return; location C is anticipating their arrival within the next decade, see Figure 3.2. This approach allows us to shed light on processes of co-adaptation by piecing together insights across the three locations. Within each state, we selected locations that appeared to have favourable conditions for coexistence; marginal; and/or mountainous areas with

relatively low human population density, abundant game populations and some type of area designation, see Figure 3.3. The selection was based on literature searches and consultation with national experts.

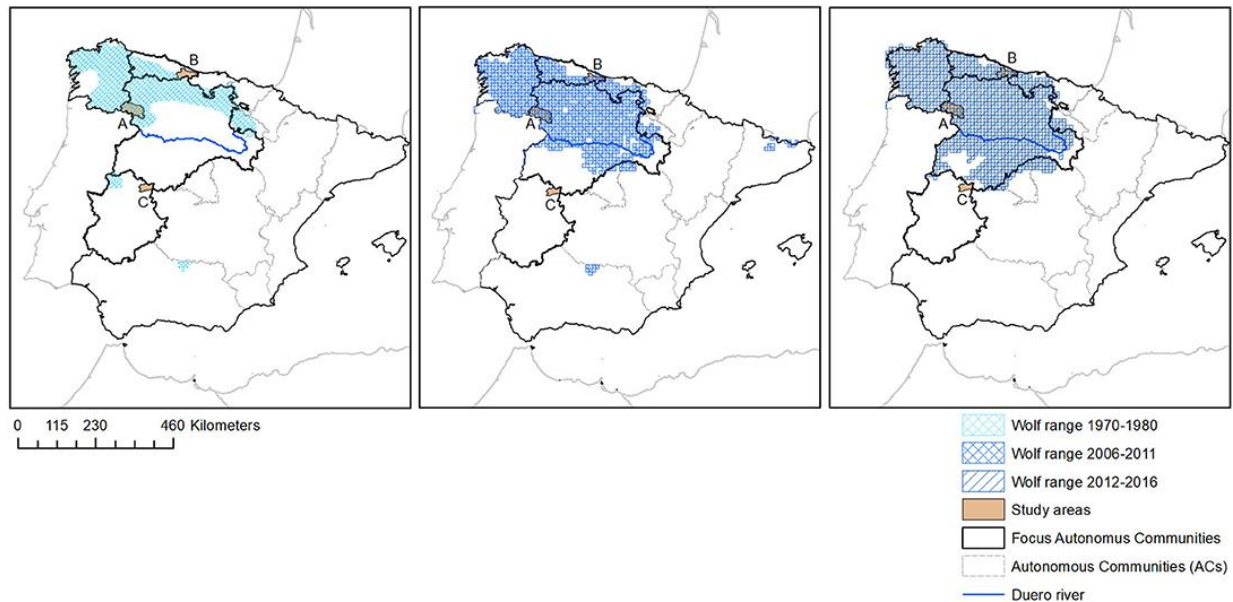


Figure 3.2. Iberian wolf expansion from the 1970s until the present, and its relation to the study locations (A–C).

Note: Data sources: Valverde, (1971); Chapron et al., (2014); Linnell and Cretois, (2018).

3.3.2 Case study characteristics: Three states of wolf presence in Spain

Increased wild prey populations and vegetation cover have since the seventies led to improved conditions for the Iberian wolf (*Canis lupus signatus*) in Spain. Widespread and government incentivized persecution had during the twentieth century limited the population to the northwest of the country (Blanco and Cortés, 2009). In 1970, the status of the wolf changed from “vermin” to game species, which restricted the time and methods with which they could be hunted (Jefatura del Estado, 1970). When Spain ratified the European Habitats Directive in 1992, wolves in north-western Spain were listed on Annex V, which must ensure favourable conservation status, while populations south of the Duero river became strictly protected on Annex II and IV (Trouwborst, 2014). Wolf populations have consequently been recovering, and the species can now be found across north-western Spain (see Figure 3.3). Their diets vary—some packs mainly predated on domestic cattle, and others mainly on wild fauna

(Llaneza et al., 2000; González-Díaz et al., 2020). Today Spain harbours one of the largest populations of wolves in Europe, estimated at 2,000–2,500 individuals in close to 300 packs (MAPAMA., 2016; Blanco, 2017).

In Sanabria-La Carballeda (S-LC), Zamora (**location A**, see Figure 3.4), wolves have had a constant presence, and hunting has remained legal due to the flexible regime of Annex V (Trouwborst, 2014). The area is dominated by a low mountain range (800–1,200 MAMSL), which contains the 67,000 ha regional Sierra de la Culebra hunting reserve, and the 23,000 ha adjacent Lake Sanabria Natural Park. The landscape is dominated by a mosaic of forests and rangelands, with marginal soils, traditionally grazed by free-roaming sheep and smaller numbers of cattle and goats (Fernández González, 2013). Traditional protection measures for livestock have remained in use, including accompanied shepherding, night-time enclosure and management of livestock guardian dogs (Vicente et al., 2000). La Culebra has become notable in recent decades for its dual fame as an exclusive wolf trophy hunting reserve and as one of the most prominent wolf-watching destinations in Europe, both facilitated by its smooth topography which makes wolves easier to observe (Martínez, 2019). In 2015, an interpretation centre dedicated to the wolf was inaugurated in Sanabria (The Iberian Wolf Centre), reinforcing the area's emerging reputation as “Tierra de lobos,” lands of the wolf (Lora Bavo and Villar Lama, 2020).

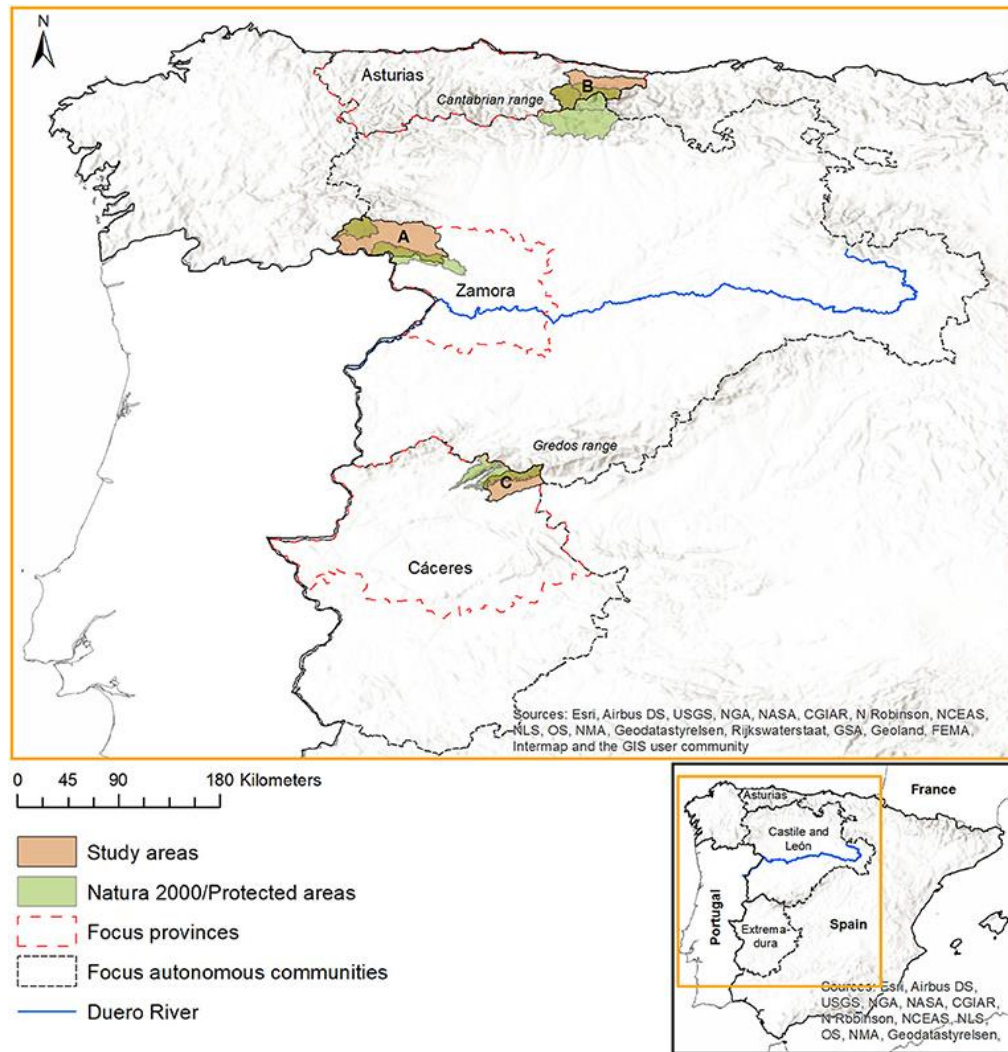


Figure 3.3. Map of case study areas (orange), and relevant protected areas (green).

Note: Location A: Sanabria-La Carballeda, with Sanabria National park to the left and Sierra de la Culebra hunting reserve to the right. Location B: Oriente de Asturias district, with Ponga Natural Park to the left and Picos de Europa National Park to the right and centre. Location C: La Vera, with the Sierra de Gredos y Valle de Jerte Natura 2000 area. Additional information about the characteristics of each location can be found in Table A.1, Appendix A.

Wolves in Oriente de Asturias (**location B**, see Figure 1.3) became extinct in the 1950s or 60s (Llaneza, 2017). Their absence enabled communities to abandon protection measures and let livestock (sheep, goats and cows) graze unsupervised, which facilitated the expansion and diversification of farm operations (Cayuela, 2004; Llaneza et al., 2016). In recent decades, a burgeoning artisanal cheese industry has emerged, including several cheeses with protected designation of origin. This has maintained a local

market for milk and a relatively high profitability among producers, despite challenging conditions that restrict flock size and management (González-Álvarez, 2015; López and Pardo, 2018). The landscape is characterized by abrupt limestone peaks (0–2,600 MAMSL), intermingled with forest patches and biodiverse temperate grasslands (García Manteca et al., 2018; OECC., 2019). The region contains Spain's first national park, Picos de Europa (PENP, 67,455 ha), declared in 1917. It is one of only two national parks that are inhabited by people, and is the third most visited in Spain (López and Pardo, 2018). Wolves started recolonizing the area in 1986 (GPA., 2016). Although wolves in Asturias are listed on Annex V, they have been declared a non-hunting species since 1991 (Trouwborst, 2014).

In La Vera, Cáceres (**location C**, see Figure 1.3) the absence of wolves (extinct in the 1960s, Rico et al., 2000) enabled a similar trajectory of abandonment of protection measures as in location B. The area is characterized by the Gredos mountain range (400–2,400 MAMSL), with a forest and rangeland mosaic that has traditionally been grazed by goats. It is cataloged as Natura 2000 and high nature-value farmland (JuntaEx, 2014). In recent years the livestock sector has had significant issues with Bovine tuberculosis, which has a high prevalence in the region (Carrasco-García de León, 2015). The area has a prominent hunting sector and is a famous big game destination, particularly for ibex (*Capra pyrenaica*; Martín Delgado et al., 2019). In 2001, wolves recolonised the northern side of the Gredos range (Ávila province, Castile and León), which is just north of La Vera's border (see fFigure 3.2), and in the same year the wolf was listed as critically endangered in Extremadura (Annex II and IV; JuntaEx, 2014; JCyL., 2016).

3.4 Data collection and analysis

Fieldwork took place from January–December 2020, with between 3 and 4 months spent in each location (approved by the Research Ethics Committee at the University of Leeds; AREA 19-018). Primary data sources consisted of observation and key informant interviews, purposively sampled to elicit the knowledge and lived reality of local communities and gain a deeper insight into local perceptions and experiences of coexistence (Smit and Wandel,

2006; Rust et al., 2017). Observation (participant and non-participant) was continuous and included accompanying farmers and wildlife managers during their daily tasks, attending local and regional events, and informal conversations with local residents. For each location, a stakeholder network was produced through a snowball approach, from which we selected interviewees who were representative of a particular group, value orientation or coexistence capacity (Berg and Lune, 2014). In total, 92 semi-structured interviews were conducted, 29–31 per site, in addition to three national-level carnivore or traditional landscape experts (see table I1, Appendix I Supplementary materials for chapter three). This sample enabled us to capture various perspectives within the different local groups, and triangulate them with those of civil servants at the regional level and national level experts. The interviews were either tape-recorded and subsequently transcribed or annotated during and after the interview. Questions were focused on rural dynamics, factors relating to wildlife interactions and aspirations for the future. Unless brought up by the informant, questions relating to wolves were asked at the end of the interview, in order to understand if and to what degree wolves were a main concern for local communities. Through this approach we could minimize potential rehearsed or polarized stances related to the wolf topic, encouraging communicative rather than a strategic rationality during the interview (von Essen and Hansen, 2015).

In order to contextualize and compare our findings, we supplemented primary data with an analysis of visual media (documentaries, short films and promotional videos; see Table I.2, Appendix I Supplementary materials for chapter three) on the topics of human–wolf interactions and traditional farming, all produced in Spain during the last 5 years. We also surveyed local and regional newspapers and social media content during the fieldwork, to gain an overview of active debates and discourses about wolves and rural politics. Finally, we surveyed official documentation, such as management plans and information on wolf status, from Castile and León, Asturias and Extremadura.

Following a grounded theory-type approach (Mabon et al., 2020), we continuously recorded and summarized observations and reflections during

the fieldwork. This enabled us to identify recurring themes across the different coexistence states and to adapt the focus of the research accordingly (Rust et al., 2017). To gain a broad perspective on the entire dataset, the resulting notes and interview and visual media transcripts were qualitatively analysed and triangulated through thematic coding. The coexistence conditions of the framework were not used as separate elements of analysis, since they are interdependent and manifested in idiosyncratic ways in each location. Rather, the framework was used to provide an initial coding structure, established in NVivo software (QSR International UK Ltd.), which was then populated by the conditions, issues, trends and aspirations as they emerged through the coding process. This iterative approach enabled the data codebook (see table I.3, Appendix I) and the narrative structure of the findings to stem from what was deemed important by the informants, and on how they presented factors relevant to coexistence and their synergies within the system (Smit and Wandel, 2006). Key quotes from informants (coded with number and letter according to the study locations) represent perceptions of the most significant coding categories.

3.5 Results

The following sections present the case study findings as seen through the framework, beginning with SES trends as well as issues that were shared across the study locations. Next, results from each location are presented, beginning with the current state of the wolf persistence condition (historic presence and absence, current population numbers and protected status) before presenting themes relating to social aspects of HCI.

3.5.1 Common trends across the coexistence states

Traditional, extensive livestock practices have persisted in the study locations, where they retain their significance for local livelihoods and cultures. In the last 50 years however, the number of farms have decreased drastically (Izquierdo and Barrena, 2006; MITECO JCyL., 2014). Despite the acknowledged quality of the products, the cultural values and the advantages to animal health and biodiversity, shepherds have struggled to

compete as local markets and infrastructure disappeared and the number of intermediaries in the supply chain increased (San Miguel et al., 2017). The limited economic viability of traditional farming has been exacerbated by inequities in agricultural policies which, despite recent greening efforts, are still biased toward farm size and efficiency over environmental and social indicators (Chemnitz et al., 2019). Informants expressed that they often struggled to meet subsidy allocation criteria, such as having enough animals per ha, producing enough per animal, or due to the extent of shrub/forest cover on their pastures. These trends contributed to changed animal husbandry practices, such as the drastic decline of goats and sheep in favour of cattle, which are less vulnerable to predation and less management intensive, with a more reliable consumer demand and higher agricultural subsidies:

“Six years ago my son decided to stay in the village [...]. As a mother, I couldn't support him to stay with sheep. Because sheep is very “esclavo” [slave-like/work intensive] and here, in addition to the slave-like conditions, we have the wolf [...] and I didn't want that life for my son. So I told him that I would support him if he wanted to stay here, perfect, but then we would have to go over to cattle farming, which gives you, within quotation marks, more free-time.” (Farmer and former shepherd, A16).

While the numbers of both shepherds (traditional managers of sheep and goats) and farmers (cattle owners) have declined in the villages, the sizes of the flocks have increased to keep up with rising costs. Some farmers have opted for a second profession to reach economic stability and improve living standards. This has resulted in larger numbers of unaccompanied livestock in the mountains, particularly cattle, and decreased the capacity for oversight and defense against predators. Informants described a homogenization of the landscape matrix, with increasing contrasts between easily accessible, intensively grazed lands and the more remote or marginal areas, which have become abandoned to nature-led processes. The trend has transformed the traditional landscape; infrastructure (trails, shepherd cottages and drinking stations) has fallen into disrepair and open areas have become recolonised

by scrub, leading to the loss of flora and fauna associated with alpine grasslands and hay meadows, and increased prevalence of wildfires. This has increased management costs for remaining landowners, thus perpetuating the cycle, leading researchers and institutions to call for increased efforts to support and recover traditional farming practices (Izquierdo and Barrena, 2006; MITECO JCyL., 2014; Urivelarrea and Beaufoy, 2019).

Landscape homogenization has also reduced the buffer zones around some of the villages, which has contributed to a sense among informants that wildlife have become more numerous and bold, resulting in increased damage to crops and livestock, traffic accidents and transmission of zoonotic diseases:

“The houses and the villages are nowadays small islands within this territory, and when wolves look for food they may pass by the four houses that are still inhabited. They come close because the food is close. Before the food was one or two kilometres away, now it is next to the houses. So when people abandon the villages, the vegetation “consumes” the territory that used to be cultivated [...] and the wild prey reclaim this territory. The more the landscape is depopulated, the more wildlife there will be and the more wolves there will be. [...]” (Biologist, A13).

In recent decades, there has also been a shift in how the landscapes of the study locations are valued by outsiders, from places of production to places of recreation. All three areas are experiencing increasing volumes of visitors, expanding from those arriving to visit resident family members or holiday homes to a diversity of tourist groups. Many are attracted by nature experiences, a trend that is projected to keep growing (MAPAMA, 2017). This has caused friction over the purpose and use of nature and wildlife (GCG, 2018). Farmers and shepherds often felt misunderstood or judged by outsiders, for instance over their role in preserving the landscape:

“[...] this is a place a lot of tourist come to see. But why are there so many tourists here? Because people like to see the landscape, the look

of it. [...] But without this [farming], it will disappear, the paths will disappear, the meadows will disappear. No one will “clean it” [from scrub].” (Shepherd and cheese maker, B5).

Another common theme concerned competition over land-use. This is particularly evident in the summer, when thousands of tourists cycle and hike through the traditional pastures. These trends are altering the space, habitat connectivity and resources available for wolves and people in each study site, with associated effects on local coexistence capacities, which is described with more detail in the following sections.

3.5.2 Location A: A shift in the coexistence state?

With regards to population persistence, the combination of regulated hunting and improved policies for nature protection have converted S-LC into a buffer zone for wolves. The area has one of the highest densities of wolves in Europe, which has remained stable around 16 packs since the late 1980s (Sáenz de Buruaga et al., 2015; JCyL., 2019b). It has also contributed to making the area famous as an exclusive hunting destination for wealthy outsiders, particularly for trophy hunting of red deer (*Cervus elaphus*) and wolf within the La Culebra reserve (Vicente et al., 2000; Martínez, 2019). Citing these factors, informants generally agreed that the conditions for long-term wolf persistence in S-LC were very favourable.

When the status of wolves changed to “game species” in 1970, the authority over wolf management was transferred from informal to formal institutions (Blanco and Cortés, 2009). This makes the regional government responsible for compensating damage to livestock within regional hunting reserves, such as La Culebra, while in the rest of northern Castile and León a specific insurance is required (JCyL., 2008, 2018). The regional government also manages the sale of hunting rights. Public auctions are organized and the funds redistributed to landowners on a yearly basis. These responsibilities have provided governing institutions with a clear management aim; to maintain stable wolf populations to enable and justify the continuous harvest of trophy specimens, which they have been effective in achieving since the 1980s (Blanco and Cortés, 2009; JCyL., 2018). According to local wolf

experts, hunting has also been instrumental in retaining a sense among locals that wolves are being “controlled” and contributing to economic development, which has improved tolerance for their presence:

[Without hunting,] the wolf wouldn't be here. It would have been exterminated like in other sites. Thanks to the fact that it is a game species, and that it moves money they hate it less here. And there is no poaching. Because it generates money, anyone who wants to poach a wolf here will be reported by their neighbours, because it deprives them of money [...] (Biologist, A13).

The pre-existing frameworks for monitoring and capitalizing on wolves have facilitated the emergence of tourism activities. There are now 12 wolf-watching businesses that completely or partly base their operations in the area, four of which have local offices (Lora Bavo and Villar Lama, 2020). In 2017, there was an estimated 3,100 visits, and almost half of the overnight stays in the La Culebra villages were attributed to wolves. To appeal to these tourists, various local businesses and producers have started using the wolf as a branding tool, visible as symbols and names across the area. The burgeoning sector led some informants to perceive that wolf tourism had overtaken both agriculture and hunting in economic importance: “*So what is left to work with, as far as I can see as a mayor, and the government is supporting me in this, is tourism. They say [...] that not everyone can live off of tourism. But the tourism is helping us to not go under.*” (Mayor, A1).

Wolves were also widely believed to regulate the area's ungulate populations, which were causing significant damage to agriculture: “*the wolf is needed to control all of the other fauna, the wild boar [*Sus scrofa*], they are invading us.*” (Mayor, A22). When local issues were discussed with informants, problems with ungulates were often mentioned before damage caused by wolves, which despite the high wolf density have remained comparatively low (JCyL., 2016). This has been possible because of local farmers' and shepherds' continued use of traditional protection measures (guardian dogs, shepherds and enclosures), which they described as the only way to avoid being ruined by depredation. Various shepherds and

farmers emphasized that it is crucial to complement these measures with clearing scrub, not only to maintain pasture, but also to decrease hiding-places for predators (including wolves), and for guardian dogs to effectively survey livestock (see Figure 3.4). Although these measures are work and resource intensive, their effectiveness were widely acknowledged, since they have been validated and passed on from generation to generation. Farmers and shepherds often perceived them as an integral part of local animal husbandry, as expressed by an elderly shepherd: *“Here, it would never occur to anyone to let the sheep out alone”* (A23). A young farmer elaborated:

“7000 [euros] is what I have to spend on the dogs each year. For insurance and for food for the dogs [he had 21]. And if I wouldn't have had to spend that on the dogs, that money would be for me, and I would live better. I could have done a lot with that money. So what happens? Well, if I notice that I can have a calmer life and calmer cows with some dogs, then I sacrifice myself.” (A15a)



Figure 3.4. Case study locations.

Note: Depicts site A–C, from top to bottom, exemplifying local farming systems (left), and village settings (right).

Although opinions diverged over the acceptable size and impact of wolf populations, we encountered remarkably few expressions of fear or intolerance toward the presence of wolves among livestock owners or villagers. With the surge of pro-wolf agendas in Spain, this tolerance and the ability of S-LC's farmers and shepherds to live alongside wolves is becoming increasingly admired and politicized (see Table I.2, Appendix I Supplementary materials for chapter three). One example was a young shepherd family who manage their flock with 18 guardian dogs, and who have launched their own “Grazing with Wolves” product brand

(<http://www.pastandoconlobos.com/>). They are often featured in NGO campaigns or to demonstrate the viability of coexistence in newspapers and social media.

However, according to the area's shepherds and farmers, their coexistence practices were not acknowledged in any practical sense and it did not positively influence the value of their products. Conversely, local market initiatives, such as the wolf-brand, have struggled to gain uptake and have been hampered by bureaucratic requirements from the agro-food industry, which largely fails to consider artisanal producers (Hinojosa et al., 2018). The narrow economic margins reported by informants meant that the relative costs of preventing and withstanding wolf damage were significant, yet support for preventative mechanisms is limited to the conflictive regions in the south of Castile and León, where the wolf is strictly protected (JCyL., 2018). In addition, the damage compensation scheme is slow (informants reported delays of up to 2 years), cumbersome and the amounts received are considered small, making it ineffective at reducing livelihood sensitivity to wolf predation. Similar issues were reported for the wolf insurance scheme: *“the cost of the insurance is more than the cost of those 5 or 6 sheep that you lose [per year].”* (Shepherd, A11). These problems lead to poor local uptake and often caused farmers to abstain from reporting damage, thus skewing the area's damage statistics.

Nearly all informants expressed that they felt neglected or abandoned by the regional government, which was perceived as corrupt and disinterested in the concerns of small farms. There are few alternative livelihoods, and the resulting depopulation perpetuates the dismantling of social services and infrastructure in the region (MITECO JCyL., 2014). While tourism is increasing, it is concentrated on summers and holidays and for relatively few stakeholders, whose income is limited during the rest of the year. Informants therefore often had pessimistic views of the future, for their village in general, and the shepherd culture in particular: *“No no. This won't continue. It won't continue because there is very low profitability. And then it is quite a hard job. There are no weekends, no parties, no vacations.”* (Shepherd, A23).

“So the future, black. Because the people don't have jobs. And the tourism, yes, but there needs to be incentives so that restaurants and hotels can survive with few people, because if there are no hotels and no restaurants, how will tourists generate money?” (Owner of a wolf-watching business, A4).

3.5.3 Location B: Lessons from 30 years of wolf-related disputes

In location B, informants described how the conservation and vigilance protocols for wolves, which were established in the eighties, had prevented the re-emergence of previous practices for “keeping wolves at bay.” These included hunting, traps and poison, often conducted by specialist “vermin” hunters (Vielba Infante, 2018). The absence of these practices enabled wolves to recolonise the Asturian part of PENP, originating from the southern slopes of the Cantabrian range (Cayueta, 2004; GPA., 2016). In 1992, 20 years after the first pack had become established, the population had expanded across the whole area of the park and into neighbouring areas (Llaneza, 2017). With the current six family groups, local experts estimated that the population in PENP has reached ecological carrying capacity. The adjacent areas (Centro-oriental/PENP management zones) are also considered fully colonised. In 2019, the population was estimated at approximately 12 stable packs, including those within PENP (GPA., 2019).

Despite protests from conservation NGOs (Llaneza et al., 2016), the regional government has, since the eighties, implemented a program of wolf culling within delimited management zones where coexistence is deemed feasible, including within PENP (GPA., 2019). Even so, wolves have continued to expand toward the ocean and into areas that are considered unsuitable due to high densities of livestock and/or people. In these areas, culling is conducted whenever considered necessary, and in exceptional cases whole packs are removed (GPA., 2016). Civil servants deemed this approach necessary to address the accelerating levels of livestock damage and ensuing social upheaval since wolves returned: *“It is clear that if you have damages and you eliminate the wolf, the damages [to livestock] will*

decrease. We have a series of data that show that when you remove a significant amount of wolves, the damages decrease.” (Civil servant, B2).

However, communities were not consulted about when and where controls were to take place. According to civil servants, restricted hunting methods and challenging conditions (see Figure 3.4) have also meant that established quotas were rarely fulfilled. This exasperated livestock owners, who overwhelmingly considered the regional government ineffective at realizing the promises of the wolf management plan and addressing the wolves that were causing damage. In addition to control, a damage compensation scheme has been operated since 1989 (García Hernández et al., 2019). In recent years some minor funds for guardian dogs and livestock fencing have also been provided (GPA., 2019), although evidence of the local efficacy of these methods is limited (Llaneza et al., 2016). Both schemes were generally perceived as ineffective by locals. Farmers and shepherds were unanimously dissatisfied with the bureaucratic and evidence burden of the compensation scheme, as well as how livestock was valued within them. The uptake of preventative methods was limited, since a variety of social and ecological factors were deemed to make them unfeasible:

“I don't have any dogs. [...] The mastiffs are very defensive, and here there are a lot of tourists. And another factor is that this area is very steep, so there might be four goats over there and four over there. How many mastiffs can you have? Should you have 70 mastiffs in order to have one for each individual [goat]?!” (Shepherd and cheese maker, B5).

“With how mountainous and agrarian it is [in PENP], [...] the preventative methods will never be 100 % effective. [...] we have to keep in mind that they will not be a panacea.” (National wolf expert, B3).

Informants also reported that wolves had altered their hunting patterns, more frequently attacking during the day to access the “easy pickings” constituted by sheep and goats, thereby rendering night-time enclosure less viable as a solution. Increased attacks on cattle were also reported, particularly on young calves. Informants often attributed the continuing decline of free-

range shepherd cultures and the increase of stabled animals in the valleys to the return of wolves, since people struggled to cope with the worry and trauma of finding one's livestock injured and killed. The pastoral landscapes and artisanal cheese making are emblems of the area and crucial for local economies, identities and cultural heritage (Izquierdo and Barrena, 2006; González-Álvarez, 2015). Among locals, it represented the toil of previous generations, and preserving its beauty and function was considered vital. Damage to the livestock sector was therefore a major concern among informants across different groups. While conservationists and some civil servants emphasized the symbolic and ecological importance of harbouring a flagship species such as the wolf in PENP, efforts to gain local support for wolf presence have generally been unsuccessful. Anti-wolf groups and discourses are still prevalent in the social and public media, and protests tend to reignite as soon as there is a surge in livestock damage (Llaneza et al., 2016). However, after over 30 years of entrenched disputes, informants described an emerging pragmatism, chiefly among locally based stakeholders:

“For the farmers, there have been years and years of pressure and threats [...]. And then they get tired. [...] They have noticed that society would not allow it, they would not accept zero wolves. That is a part of it. So now, when the farmers come here, you can talk to them without a problem. That before was very hard. [...] the conservationists too. And they notice, I think, [...] that they have been fighting for many years against the killing of wolves, especially when many have been killed, but they see that the wolves are still there, even increasing.” (Civil servant, B2).

“People nowadays are less fanatic. Both the conservation sector and the farmers [...] It would be very rare for you to find a farmer that will talk about extinguishing the wolf. Maybe they will say that in this particular area it is incompatible, but not about general extinction. (Farmer and sector representative, B1).

Some initiatives are exploring new ways of improving local coexistence capacities, independent of public institutions. An interesting model is provided by a NGO for the preservation of the bearded vulture (*Gypaetus barbatus*; Fundación Quebrantahuesos., 2020). They are vulnerable to the use of poison and certain livestock medication (such as diclofenac), which they ingest when feeding on livestock carcasses. These properties link the vultures with the fate of both wolves and shepherds, leading the NGO to launch a “Pro-biodiversity” certification for producers of lamb. Improving coexistence with local fauna, including wolves, is one of the main criteria for inclusion, although it is not prescriptive about which methods should be used. The certification, which is free of charge, provides shepherds with a price premium for their products, in addition to publicized recognition of the environmental benefits of their labour. The project won the EU Natura 2000 award within the “socio-economic benefits” category in 2020 (European Commission., 2020), and after some initial apprehension there is now a waiting-list to join the scheme (Fundación Quebrantahuesos., 2020). A shepherd who was incorporated from the start was content with the needs-based approach of the project managers:

“They are the only foundation that has come here, gotten out of their car, and asked us what could be done. He did. And we are very satisfied. [...] And they pay us well. I mean, it is a reasonable price, not like before, and it is all on paper, signed. So then you can work in a different way. If you know that you have a goal that you need to fulfil, it is much easier to work. You know that someone will buy it, you know which day and how much you will get paid. You know it all.” (Shepherd, B26).

This project, in addition to the profitable artisanal cheese industry and the comparatively strong farming culture of the area, contributed to more optimistic views about the future of traditional farming than in location A and C. However, attacks on livestock and the associated trauma remain a challenge, notwithstanding the decreased economic severity on shepherds' and cheese-makers' livelihoods. Thus, when asked for their advice to areas

where wolves may return, two civil servants who have worked throughout the process emphasized:

“The most important thing is to take those affected into account. Farmers, hunters, local councils. And with them achieve a “closer” [place-based] management. [...] They have to be part of the solution.” (B31).

“To sum up; I think that you have to protect the traditional activities that still remain, the few flocks that still remain, because they also have biodiversity function that is very important [...]. So we have to have a bit of everything, actions of mitigation, money [compensation], and, once in a while, some [wolf] population controls of course.” (B2).

3.5.4 Location C: The wolf, a friend or a foe for the area's goat sector?

Due to their critically endangered status, the regional government is required to facilitate the process of wolf recovery in Extremadura, with the aim of restoring self-sustaining populations (JuntaEx, 2014). Ecological conditions for wolves in La Vera were deemed favourable by local civil servants; human population density is relatively low (27 habitants/km² in 2017), there are abundant ungulate populations and increasing expanses of woodlands. Except for wolf mortality in the north of Gredos, due to culling and reprisal killings (JCyL., 2019a), no physical or legal barriers prevent wolves from recolonizing the area. Some informants claimed it had already occurred (there were rumours of wolves roaming the uplands), while others believed it could be delayed by up to 10 years.

According to a stakeholder within the regional government, plans for wolf return have been made, including programs for locally based community workers, vets and field staff, as well as economic support for general farm improvements for those residing in wolf areas (ex-post payments). There were also plans for ecological monitoring schemes before and after wolf return, in order to improve data on trophic impacts of wolves on local ungulate and meso-predator populations, and associated benefits to people (JuntaEx, 2014). The plans are partly modelled on reintroduction programs

in which some of the project staff have been involved: the Iberian lynx reintroduction project in the south of the region (<http://www.iberlince.eu/>), and the Iberá rewilding project in Argentina (Zamboni et al., 2017), both of which have had some success at decreasing local vulnerabilities and increasing support for species recovery (Jiménez et al., 2019; Pettersson and de Carvalho, 2020).

However, the government has not communicated these intentions and has been critiqued for its failure to produce and publish a species recovery plan, which is a legal requirement for critically endangered species (Fernández Marugán, 2020). Local informants generally believed that preparation for wolf return was completely absent, and worried about the resulting proliferation of disinformation and social disputes:

“If we don't start talking about the wolf now, there are going to be big killings [of livestock and wolves]. And problems between neighbours, problems between people. Because there are people who are against and people in favour. But there are also people who are afraid and who don't know whether to be in favour or against.” (Local civil servant, C3).

In order to mitigate polarization, informants called for transparency and for local consultation with those susceptible to negative wolf impacts, mainly the local livestock sector. Informants within this group expressed the most apprehension toward imminent recolonisation. Elderly shepherds who still remembered co-habitation agreed that the disappearance of wolves greatly facilitated livestock practices and preferred maintaining this status quo:

“People could relax, it was marvellous! It was as if they had imprisoned one of those [criminals] who do a lot of robberies.” (Retired shepherd, C6).

The absence of wolves did not prevent the demise of the farming sector, however. A major driver has been the regional government's tuberculosis eradication program, which mandates killing or immobilization when cases are detected in herds (Majadas Andray, 2020). It drastically increased farmers' vulnerability, and the uncertainty over its efficacy to curtail the disease caused widespread distrust in the regional government. It has also increased friction between farming and game managers, since game are

vectors of the disease, while only livestock is subject to sanitary controls. This has led some stakeholders, including livestock owners, to ponder alternative solutions and the role of the wolf in regulating ungulate populations, notwithstanding the limited evidence of this relationship: “[...] *the only way is the wolf, that they come back. So that it [the boar population] goes down.*” (Shepherd, C26).

“But you know what, in Asturias and such they don't have tuberculosis, but they have the wolf. And of course, it has removed all of the game. [...] So in the groups [of livestock owners], among us, we have talked about it. We said “what do we want, the wolf or tuberculosis?” Because for the wolf I have management approaches, but against tuberculosis...” (Shepherd, C17).

The management approaches referred to were the use of guardian dogs and night-time enclosures, which several of the shepherds had maintained, albeit to a lesser extent, to protect flocks from mesopredators and to facilitate milking. Among farmers, whose cattle often roam in the mountains with minimal supervision throughout the summer (see Figure 3.4), these measures were generally not perceived as feasible.

Notwithstanding the uncertain benefits and the potentially adverse impacts of wolf return, none of the shepherds or farmers expressed strong views against the animal itself. It was generally agreed that they had to exist, although often with caveats such as “but not here,” “behind fences,” or “strictly controlled.” These views may be driven by changing values and a similar pragmatism as that of location B, as exemplified by a recent newspaper article: *“That's the way it is, society is going this way [toward wolf tolerance], and you have to adapt [...] in my opinion it is best to be aware and follow where the tide is going because going against it is not going to be possible”* (Shepherd, interviewed by Arrebola, 2021). Their main concern was usually related to how the species would be governed. This stemmed from negative experiences of top-down conservation legislation over recent decades, which they felt had limited their autonomy and ability to address the problems they faced on a daily basis, such as regeneration of scrub.

Reticence toward conservation projects and legislation was prevalent, since the government failed to provide effective alternative tools, and since local participation in related decision-making was limited.

However, since the livestock sector continues to decline, a common perception was that its resistance was less of an impediment to wolf recolonisation and coexistence than that of the hunting sector, which has increased in political and economic influence with the increasing demand for big game (San Miguel et al., 2017). Game managers expressed worry at the prospect of wolf return, particularly with regards to ibex, which attracts wealthy hunters from across the country and the world. Prices for old males (which have larger horns) can exceed 10,000 euros at auctions, money that would be lost in the case of wolf attacks:

“Economically, it will be us who are affected [...]. With the wolf, in the Ávila area 3 years ago, we noticed the expansion from north to south toward this area. And honestly, over there it is has done a lot of damage. [...]. Because the wolf has killed the old animals, especially the old ones. And the problem with killing old animals is that they are the ones that are worth the most money.” (Manager of hunting association, C9).

Among village residents, trophy hunting often invoked negative emotions, and damage to the sector was not viewed with the same concern as those to the livestock sector. This is probably a legacy of deep-rooted connections to traditional landscapes and cultures, which in La Vera (as in the other study areas) form part of local identities (Urivelarrea and Beaufoy, 2019), whereas trophy hunting is attributed to foreign upper classes. However, shifting livelihoods are leading to a gradual decoupling of people's lifestyles from the landscape: *“No matter how much they live in a village, they are increasingly urbanized”* (Village resident, C16). Many of those who own land in the mountains live remotely, leasing to farmers or game managers, or leaving it in abeyance. These trends caused weaker cohesion among land managers and confusion over management responsibilities, e.g., who should clear shrub and where. Arson, which was driven by tensions between uses and the need to regenerate pastures, fed into this cycle and increased the

prevalence of wildfires: *“So that abandonment, if we look at it in the short and medium term, is very worrying. Because quite immediately it is followed by fires. But are these fires because they are the natural dynamics of abandoned spaces or it is because tensions persist in that transition? I think it is more because of tensions.”* (Regional agro-ecology expert, C11).

Fire prevention constitutes a significant economic burden for the region, leading to calls for a recovery of traditional grazing practices among locals and organizations (Urivelarrea and Beaufoy, 2019; Majadas Andray, 2020). The calls cite a scheme which has proven effective in other parts of the country: the provision of commons and municipal infrastructure for shepherds, to use for minimum expense in return for environmental services (Lasanta et al., 2018; Sánchez-Mesa Martínez, 2019). One such initiative is currently being considered in one of the study municipalities, and could be instrumental in improving conditions for local shepherds. The success of this program (i.e., more goats in the mountains) could increase the risk of damage and disputes once wolves return.

3.6 Discussion

Viewing our findings through the Resilient Coexistence Framework illustrates the complexity of local HCIs, and their contingency on wider SES processes. In the following section, we argue for proactive and participatory approaches to increase community capacity and willingness to coexist with large carnivores, and discuss the importance of reconciling the preservation of biological and cultural diversity.

3.6.1 A systems perspective of the conditions of human-wolf coexistence

Tracing the process of Iberian wolf expansion through our study sites, it was clear that they could adapt and flourish in habitats of varying human population density and resource availability, from the mountains of Asturias to the plains of Castile and León. Given their behavioural plasticity and dietary flexibility, wolves could probably recolonise most of rural Spain, as long as they are not hindered by people (Blanco and Cortés, 2009). This

was exemplified by the increasing levels of human–wolf interactions and “bold” behaviour in the vicinity of the study villages, due to decreasing buffer zones and intensity of human persecution. This phenomenon is supported by earlier findings from a nearby region of Asturias (García Hernández et al., 2019) and has been described for other large carnivores elsewhere (Ghosal et al., 2015). In conjunction with supporting conservation frameworks (Cretois et al., 2019), this points to a promising future for the persistence of self-sustaining wolf populations in Spain. As concluded by Mech (2017, p. 314), wolves “could live almost anywhere. The real question society must face is where will people tolerate them?”

With regards to people, the systems perspective adopted for this research revealed a more complex picture of coexistence. In our study locations, it was important to distinguish between the tolerance of wolf presence and the tolerance of wolf governance, which had different roles in driving positive or negative synergies between coexistence conditions. In location A, the continuous presence of wolves led people to think of them as an integrated part of the local system. This facilitated adaptation and ensured an uninterrupted evolution of informal coexistence institutions, for instance visible in how livestock owners have continuously adjusted the number of guardian dogs, the relatively nuanced media coverage of wolves from the region (Delibes-mateos, 2020), and in the wolf-branding of local products to follow social trends (Martínez, 2019). The wolf was integrated, not only as a part of the economic, social and ecological system, but also in the story of S-LC (i.e., “lands of the wolf”), thus legitimizing coexistence as a way of life (Martínez, 2019). This could explain the relatively harmonious coexistence state over the last 20 years, despite its challenges and despite failing support from and for governing institutions. Similar findings were made by Dorresteijn et al. (2014) in Romania, where continuous coexistence with bears fostered the development of management tools and attitudes that effectively reduced conflicts.

Where these habits and institutions are absent, and where there are risks to carnivores and human interests, formal institutions have a crucial role to ensure that the process and outcomes of carnivore return are acceptable to

local communities (Decker et al., 2016; Linnell and Cretois, 2018). Our findings from location B indicated that the failure to achieve procedural or outcome legitimacy for conservation agendas had been a major driver of wolf-related disputes in the area. Distrust in governing bodies was ubiquitous, and there were few opportunities for participation in decision-making processes. The regional government struggled to balance the preservation of natural and cultural elements of the area, also before wolves returned, which was illustrated by the continuing decline of traditional shepherd cultures within PENP (Izquierdo and Barrena, 2006; López and Pardo, 2018). This resulted in nature conservation and the survival of traditional cultures becoming framed as incompatible policy choices, by locals and in the media, and the wolf has come to embody the former. This contributed to the rejection of wolves and refusal to adapt, since the traditional land-use systems were important for local economies and identities (González-Álvarez, 2015). This fear of “losing the landscape,” and its links to large carnivores, has been observed elsewhere, for instance India, Sweden, and Norway (Ghosal et al., 2015; von Essen and Allen, 2018). A shared finding between these cases was the perception that traditional management is becoming impossible due to the increasingly hegemonic position of the wilderness ethos (promoting protection over production) within public opinion and policymaking. A contributing factor in location B may be the lack of tangible benefits of wolves for locals. In contrast to location A, the topography and controversial status of wolves have deterred wolf-watching businesses, ungulate overpopulation was not among the major local concerns, and there were no incomes from hunting wolves. If effective coexistence programs are not established by the regional government within the near future, the same problems could emerge in location C, since many of the same risk elements are present: unprotected livestock, cultural importance of traditional land-use systems and distrust in governing institutions (Majadas Andray, 2020).

We contend that considerations of vulnerability and relationships to the land are imperative to understand how governance can be improved and coexistence capacity increased. Consulting locals about these factors could

elucidate barriers or risks to coexistence, for instance economic precarity and the synergies between wolves, local livelihoods, identities and wider trends (Salvatori et al., 2021). Our findings indicate that this perspective has hitherto been missing or hampered by institutional silos in both location A and B's conservation programs. Their approaches to maintain or increase coexistence have primarily centred on ex-post payment schemes, established under the assumption that they would decrease farmers' sensitivity to and intolerance of carnivore depredation. As we have shown, and as found elsewhere (Ravenelle and Nyhus, 2017; Marino et al., 2018), these schemes have not been effective in either of these regards. Conversely, they have exacerbated distrust of the national and regional governments and official statistics, since validation and payments are slow, cumbersome and underfunded (GCG, 2018).

The other prominent approach was to decrease exposure between livestock and wolves. The focus had been lethal control of wolves and support for a predefined set of preventative mechanisms, which was also associated to several resilience issues. Some form of lethal control was strongly supported among local livestock owners and civil servants. It has been acknowledged as a necessary element of European large carnivore management, especially to address bold individuals that evade preventative mechanisms (Linnell and Cretois, 2018). However, locals felt that current programs failed to target the right wolves at the right time. Furthermore, both hunting and lethal control is controversial among the wider public and increasingly generate backlash and legal procedures against the regional governments (Bruskotter et al., 2017), which has been recurrent in location A and B (Blanco, 2017; Camazón, 2020). Consistent with findings in other countries (e.g., Niedziałkowski et al., 2021), pressure to expand the protected status of carnivores across Spain has mounted over the last decade (Blanco, 2017). The national government recently tabled a proposal for a complete ban on wolf hunting (MITECO., 2020), which would alter coexistence conditions in the northwest of the country. While non-lethal mechanisms have proved effective in location A, wider application, research and innovation (for instance technological solutions) are needed to illustrate their viability under

conditions such as those in location B (Eklund et al., 2017; GCG, 2018). For instance, a study from the Alps, which have similar conditions (abrupt topography, small and scattered flocks and high tourists numbers), showed that damage continued to increase despite widespread implementation of guardian dogs and enclosures, since wolves had adapted their hunting patterns accordingly (Meuret et al., 2021). There was also weak support for these measures among cattle farmers, such as those in location B and C, since they would imply drastic changes in husbandry regimes.

A major problem with both these approaches has been their narrow focus on livestock damage and their limited effectiveness at increasing adaptive capacities in our study locations, whether to prepare for or maintain coexistence. For instance, shepherding and guardian dogs come at a significant sacrifice of time and resources for shepherds and farmers in location A, which in addition to depopulation and market globalization, decrease their economic margins and exacerbate their sensitivity to shocks. The failure to incentivize coexistence practices, for instance by subsidizing dog food and insurance, has contributed to the present situation in which the most wolf-compatible farming cultures are increasingly pushed toward intensification or abandonment (Chemnitz et al., 2019). As shown by Madden and McQuinn (2014), the resulting threat to local identities risks antagonizing local communities and fuels the narrative of the wolf as incompatible with farming. In addition to the loss of cultural heritage, the disappearance of S-LC's shepherds could undermine both the outcome and pragmatic legitimacy for coexistence, in location A and elsewhere, since they have become emblematic for their successful coping mechanisms. Location A also illustrates that the mutual adaptation on which resilient coexistence depends extends beyond protecting wolves and livestock. As shown elsewhere (e.g., Pettersson and de Carvalho, 2020; Rode et al., 2021), the whole range of these interconnections between wildlife, ecosystem dynamics and human communities must be taken into account to gain, explain and maintain legitimacy and coexistence capacity.

3.6.2 Place-based approaches to prepare for carnivore comeback

Community adaptation to returning large carnivores should not be pursued in isolation, since it represents just one of many social, political and ecological challenges for rural communities. Creating enabling environments for coexistence between humans and large carnivores should form part of a broader agenda to improve adaptive capacities and good governance in the light of these challenges (Darnhofer et al., 2010; Whitehouse, 2015). The associated imperative to create partnerships and bridge academic and governance silos could revitalize environmental governance, making it transformative rather than palliative (Redford and Sanjayan, 2003; Hartel et al., 2019).

Reconciling the preservation of carnivores and high nature-value farming systems, and being transparent about how and at which scale it is to be achieved (national or regional, within and/or outside protected areas), will be essential to mediate disputes and achieve just and sustainable conservation solutions (Pretty et al., 2010; Gavin et al., 2018). In our study locations, this approach could contribute to repairing the social license to operate of governing institutions (Jepson, 2005). If combined with effective communication efforts, it could also be an important element of people-people reconciliation, i.e., deliberative exchange and enhanced understanding between different social groups and worldviews (Treves et al., 2017; von Essen and Allen, 2019). Promising examples from our research include interpretation centres that jointly display the natural and cultural heritage of the region, such as that of the Iberian wolf centre in Sanabria (<https://centrodellobo.es/>), shepherds welcoming visitors into the traditional cottages and caves to learn about local cultures and products (e.g. <https://quesosdecabrales.es/>), and a participatory multi-stakeholder think-tank where wolf-policy recommendations are debated and promoted (GCG, 2018). Such initiatives can contribute to decreased polarization over wolves in traditional landscapes, and prevent behaviours that increase the risk of wolf attacks (Penteriani et al., 2016) or cause friction between locals and visitors.

Other projects lead the way to more proactive coexistence approaches through their work with rural problems. The Pro-biodiversity certification in location B illustrates that when the drivers of local vulnerability (e.g., low product yield and profitability) are understood and addressed, it can enable institutions to transform disadvantages into coexistence preconditions (i.e., exclusive, environmentally beneficial products with associated recognition and economic return for producers) (Mathie and Cunningham, 2003). Similarly in location C, plans for ex-ante payments within wolf areas, and the provision of municipal shepherd infrastructure, have the potential to reverse negative trends within the traditional sector, addressing its inherent issues with dignity, security and profitability (Lasanta et al., 2018). Rather than being prescriptive and retrograde, “custody of the territory” and ex-ante schemes enable stakeholders to seek inspiration from traditional knowledge and practices, while retaining flexibility to adapt to current societal, technological and land-use trajectories (Fuentes et al., 2011; Persson et al., 2015). When realized under the banner of coexistence, the projects could render large carnivores a positive force for change in traditional landscapes, where the loss of biological and cultural diversity often share drivers, e.g., wildfires or ungulate overpopulation (Henle et al., 2008; Pretty et al., 2010; Varga, 2020). Gaining local legitimacy for such performance schemes would benefit greatly from the presence of positive demonstration places and projects, which illustrate that functioning HCI's are possible. It is therefore imperative to ensure livelihood resilience and acknowledge existing coexistence areas such as location A, so that they can remain a source of hope and inspiration for recolonisation areas (Bennett et al., 2015; Pound, 2015).

Addressing conflicting needs and value framings with limited space and funding will remain a continuous challenge. This could become evident in location C, where programs to improve coexistence between shepherds and wolves may be unpopular with the hunting sector. Similarly, within certification schemes, the inclusion of some usually implies the exclusion of others, and since they are based on exclusivity, they cannot exceed certain quantities of output without reducing prices. These issues may never be fully

resolved, and compromises will require an active dialogue about societal priorities, in addition to transparent decision-making, to ensure procedural as well as distributional justice of large carnivore governance (Bennett et al., 2019; Salvatori et al., 2021). As emphasized by Redpath et al. (2013), the co-occurrence of conservation and livelihood preservation depends to a large extent on the willingness of parties to acknowledge and discuss shared problems, stresses and uncertainties and address them collaboratively.

3.6.3 Reflections on the coexistence approach and future research directions

Elucidating conditions that permit large carnivores to survive and reclaim territory, and that enable people to adapt, is vital to aid decision-makers in ensuring resilient coexistence in the face of global change (Carter and Linnell, 2016; Pooley et al., 2020). The combination of a coexistence lens with the proposed theoretical framework proved useful in expanding knowledge of how we can explain and support adaptive capacities. By focusing on coexistence and its underlying drivers, rather than conflict, and using the framework to explore relevant interconnections, we could illuminate positive factors and drivers that otherwise risk being overlooked, since harmonious relationships generate less attention and resources than those that are dysfunctional (Fernández-Gil et al., 2016; Pooley et al., 2017). The framework also enabled us to understand past issues and failed interventions within their wider social-ecological context, and to identify trends that may alter current HCI for better or worse. It is thereby useful as a heuristic tool for descriptive analysis of both states and pathways to coexistence. This knowledge can be used to generate future scenarios based on local conditions, and help articulate the transformations needed to progress toward them (Bennett et al., 2015).

However, thinking of HCI as a complex adaptive system means that the approach requires and yields intricate and large quantities of data. It is important that the user(s) have close connections to the location under analysis, in order to select and correctly interpret the factors that are most relevant to local coexistence capacity. We therefore encourage the use of the framework by inter- and trans-disciplinary working groups (see Hartel et

al., 2019), or to apply it in iterative processes with community groups to co-produce knowledge and ensure the credibility of the research outcomes. For instance, it could be useful to support focus groups and scenario workshops within participatory action research (see Milich et al., 2020).

More empirical studies of the social and ecological impacts of large carnivore (re)colonisation, the local viability of different preventative mechanisms and of the various functioning institutions that are already in place (including novel and traditional, participatory or top down) are needed. Building this evidence-base is essential to corroborate and validate the increasingly contested theory and rationale of large carnivore restoration and reintroduction (Treves et al., 2017; van Eeden et al., 2018). This knowledge is also needed to expand large carnivore discourse and policy beyond its current focus on the past (both practices and states of nature), to more flexible and inclusive models for the future. Lastly, continued research on how to achieve equitable representation and knowledge co-production in participatory processes are needed to ensure legitimate outcomes. For instance, on who and how to represent the rights of wildlife and how to avoid “tyranny of the majority” while adhering to the legitimate concerns of non-local people regarding the intrinsic values of nature and the use of public goods (Lockwood, 2010; López-bao et al., 2017).

3.7 Conclusions

In a time where environmental agendas are being advanced to address the climate change and biodiversity crisis, it is crucial to establish just and effective procedures for working with rural communities (Salvatori et al., 2021). We contend that facilitating coexistence with large carnivores in traditional pastoral landscapes can be symbolic of a wider pursuit to achieve sustainable and legitimate conservation governance and rural development programs. Given the continued expansion of large carnivores across Europe (Chapron et al., 2014; Cimatti et al., 2021), more inclusive and innovative approaches are needed to manage these species across human-induced borders, learn about local barriers and opportunities to coexistence and how to (re)distribute resources to ensure that co-adaptation is possible. Existing

knowledge, institutions and projects that could shorten the transition period for coexistence abound, but more effective methods to identify, learn from and support them are needed (Bennett et al., 2015; Hovardas et al., 2017). This requires reconfigured relationships and knowledge exchange between urban and rural stakeholders (including policymakers, scientists, locals and NGOs) to achieve productive dialogues and reconcile the many needs and priorities for the countryside in the future. Ultimately, the aim of conservation policy is not limited to saving contested species, but about fostering harmonious relationships between humans and the other species that inhabit this planet (Adams, 2015).

3.9 References for chapter three

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Chapter four

Who must adapt to whom? Contested discourses on human-wolf coexistence and their impact on policy in Spain

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Submitted to *People and Nature* in October 2022 (awaiting response)

Abstract

Wildlife conservation is shaped by human perceptions. They influence how species are valued, how their conservation status is determined and the perceived responsibility to coexist with them. There are different interpretations of coexistence, yet few have explored how these interpretations become institutionalised in national policies and frameworks. We address this gap through a case study of human-wolf interactions in rural Spain. The Spanish wolf population was until recently reported to be in a “favourable conservation status”, which permitted some regions to maintain hunting and culling. This assessment was changed in 2019, and in 2021, the national government declared wolves strictly protected across the country, despite strong opposition from the regions that harbour most of Spain’s wolves.

Through argumentative discourse analysis, we explore how coexistence is conceptualised in popular debates and in three case studies at different states of wolf expansion. We found three overarching discourses: “Wolf protectionism”, “High nature value-farmland” and “Pragmatic coexistence”, each proposing a distinct pathway to functional human-wolf relations. By subsequently analysing documents relating to the 2021 decree, we discerned a dominance of the protectionist discourse within the national policy domain, which provided the rationale and justification of strict wolf protection. In their current form, the decree and the new coexistence strategy are based on top-down rationale focussed on impacts to and from wolves, rather than promoting dialogue and addressing local vulnerabilities. Our findings illustrate that while flexible and participatory forms of governance are increasingly endorsed by international policy and academic institutions, more work is required to ensure their buy-in and facilitate implementation on the national level.

Keywords:

Coexistence; human-wolf interactions; governance; pathways; discourse analysis;
human-wildlife conflict

4.1 Introduction

In 1995, David Mech, then chair of the IUCN Wolf Specialist Group, observed that ‘the question of the next decade will not be how to save the wolf, but rather how best to manage the animal’ (1995: p. 271). Since then, wolves and other large carnivores have continued to expand their ranges across Europe and North America, while mobilising increasing numbers of supporters and antagonists (Chapron et al. 2014, Mech 2017). Wolves are nowadays also established in areas that are significantly altered and dominated by human activities (Boitani et al. 2015, Mayer et al. 2022). Sharing these landscapes is especially challenging since they are the subject of many other and often clashing land-use priorities, such as raising livestock and ensuring food production, preserving cultural heritage, restoring habitats and promoting recreation (Bruskotter et al. 2021, Lécuyer et al. 2022). However, carnivore recovery is gaining traction as a mechanism for both nature restoration and climate change mitigation (Ripple et al. 2014, Malhi et al. 2022), and the European Commission has recently strengthened its resolve to foster a “culture of coexistence” with carnivores across the continent (The European Commission 2021).

What coexistence means and how it may be achieved is a subject of prolific debate (discussed in depth by Lozano et al. 2019, König et al. 2020, Pooley 2021). In academia, there is a growing emphasis on conceptualisations that consider the flourishing of both humans and carnivores (mutual adaptation), and where interactions are governed fairly and collaboratively according to social, cultural and economic contexts (Carter and Linnell 2016, IUCN HWCTF 2020, Pooley 2021). Turning this vision into reality requires a transdisciplinary approach; accounting for interconnected socio-ecological challenges (Hartel et al. 2019, Bruskotter et al. 2021); power dynamics and inequalities (Pooley et al. 2017, Fletcher and Toncheva 2021); biocultural values and heritage (Pretty et al. 2010, Gavin et al. 2018) and interactions among species (Linnell and Cretois 2020, Marchini et al. 2021). We use *coexistence governance* as an umbrella term to encapsulate this holistic approach to human wildlife interactions (HWI) in shared landscapes. It can be contrasted with conventional conservation models, which have typically centred on achieving specific population targets for priority species, and which apply social interventions merely as a stepping stone to increase wildlife tolerance (Nyhus 2016, Pooley 2021). The

holistic approach is essential to bring about transformative change to how people and wildlife share space, since conventional conservation has failed to address underlying political and economic causes of conservation conflicts (Fiasco and Massarella 2022). HWI scholars have responded to this multifaceted challenge by outlining principles for planning (Jiren et al. 2021, Marchini et al. 2021); monitoring (Durant et al. 2022); and social learning/stakeholder engagement (Hovardas 2020, Salvatori et al. 2021). These principles are intended to aid practitioners in the difficult task of harmonizing top-down agendas enshrined into law, such as conservation targets, with the participatory and place-based approaches that are considered vital to achieve legitimacy for conservation policy among those who live with wildlife (Butler et al. 2015, Redpath et al. 2017, Young et al. 2021).

The principles have become incorporated in both international and European policy guidelines for good environmental governance (IUCN HWCTF 2020, The European Commission 2021, IPBES 2022). However, less is known about how people who are living with and managing carnivores envision coexistence, how they propose to make it happen and how these views influences governance at different scales (Lozano et al. 2019, Pooley 2021). The following research contributes to this gap by analysing prevalent discourses relating to coexistence with wolves in rural areas of Spain. We explore how communities at different states of wolf expansion envision the future of the landscape and the role of wolves and people within. We then trace to what extent these visions influenced a recent and highly polemic shift in the wolf protection regime (implemented in September 2021), which rendered the species strictly protected across the country. Specifically, we explore: 1. The visions and priorities for coexistence among stakeholders who are or will be sharing space with wolves; 2. The assumptions, values and priorities underpinning these visions; 3. The extent to which they are represented within the new wolf coexistence strategy; and 4. What knowledge systems were considered in the elaboration of the strategy.

By exploring how coexistence discourses are mobilized and reproduced, and by linking them with institutional conduct, we illuminate prevailing power-knowledge hierarchies and their potential influence on local stewardship and landscape trajectories. While our research is centred on Spain, the findings are of broader relevance since they reveal structural barriers and institutional silos that constrain

shifts towards transformative coexistence governance. It can thereby inform researchers and practitioners about the procedural considerations that are relevant to enable locally produced and endorsed adaptations while meeting international biodiversity targets (Bennett et al. 2019, Büscher and Fletcher 2019, Hartel et al. 2019). In the following sections, we introduce the background and study sites in Spain, outline the theoretical underpinnings of the research and our methodological and analytical approach. The research outcomes are presented in two sections: the empirical findings from three study sites and the results from the discourse analysis of policy documents. Finally, we discuss policy implications at national and international scales and provide recommendations for how to harness developments for transformative coexistence governance.

4.2 Background and study area

Spain offers a particularly interesting case for analysing coexistence policy. For most of its history, large carnivores were viewed as a threat to human livelihoods, to be extinguished or confined to remote wilderness areas (Álvarez et al. 2011). This practice was sanctioned and supported by the Spanish government and largely endorsed or ignored by the general populace (Vargas Yáñez 2008). The reduction of carnivores facilitated extensive (free-range) livestock rearing, a system practised in Spain for millennia and which persists in some parts of the country. These landscapes maintain a significant part of Spain's biological and cultural diversity and many are incorporated into its Natura 2000 network (Fuentes et al. 2011, San Miguel et al. 2016).

Similar to other western countries (Mech 2017, Manfredo et al. 2020), the environmental movement, emerging in the 1970s, led to increased engagement in wildlife conservation, especially in issues relating to the wolf (*Canis lupus*) (Blanco 2017). A small and fragmented population had persisted in north-western Spain, where shepherds to this day maintain traditional prevention practices, e.g. guardian dogs and accompanied grazing, to reduce livestock depredation (Nores and López-Bao 2022), see figure 4.1. Wolves' transformation from vermin to icon is widely attributed to Félix Rodríguez de La Fuente, an famous Spanish broadcaster, whose nature documentaries became immensely popular in the 60s and 70s. He

successfully advocated for the declaration of wolves as a game species, creating partial protection by regulating when, how and by whom they could be hunted (Blanco and Cortés 2002, Vargas Yáñez 2008). This protection was strengthened when Spain entered the EU and ratified the Bern Convention (1986) and the Habitat Directive (1992). To the South of the Duero river, which harboured few wolves, they became included in Annex II and IV of the Habitat Directive (strictly protected), while to the north they were listed in Annex V, which permits hunting provided "favourable population status" is ensured (Trouwborst 2014, Blanco 2017).

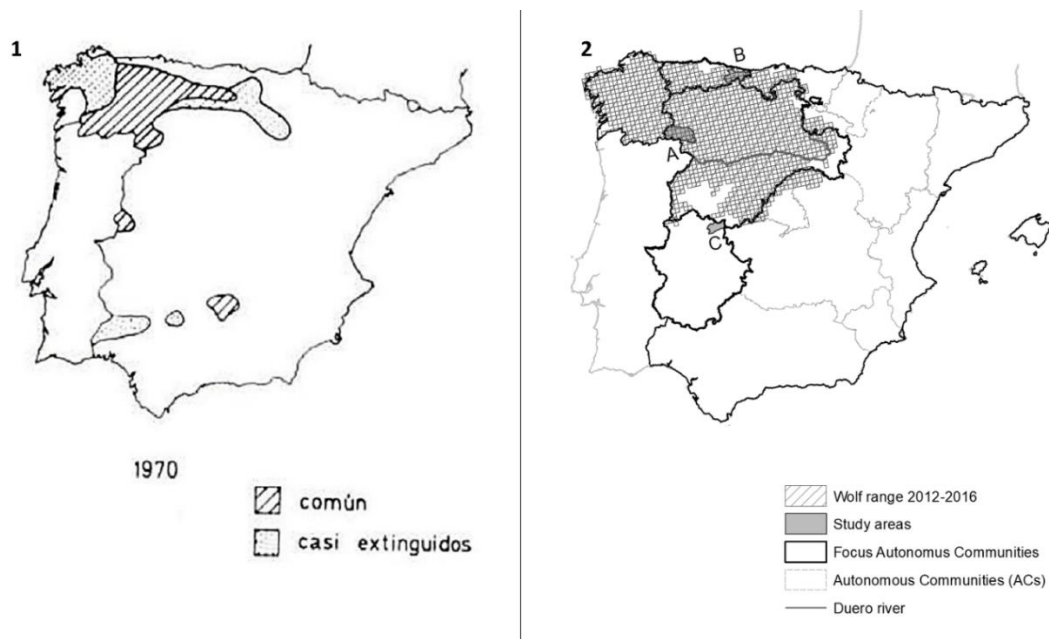


Figure 4.2. Maps illustrating the estimated range of wolves in 1970 (1) and 2016 (2).

Note: Map 1 (from Valverde 1971) differentiates the areas where the wolf was believed common (común) and almost extinct (casi extinguidos). Map 2 (adapted from Pettersson et al. 2021b) also shows the case location of the study communities (A-C) analysed in this research.

Aided by these protection regimes and by widespread land abandonment, wolves were able to recover and expand their range. According to the latest survey (2012-14), the population has increased to around 300 packs, forming a continuous population from the northwestern coast to central Spain (see figure 4.1) (MAGRAMA 2016, Blanco 2017). However, monitoring wolf populations is notoriously difficult. Estimates vary considerably depending on the methods, assumptions and sampling

period (Blanco and Cortés 2012, Marucco and Boitani 2012), which leaves space for doubt in official figures and those who produce them (e.g. GCG 2022). This has caused disagreements over the “true” number of wolves and the historic baseline of the population in Spain (Nores and López-Bao 2022). There are similar disagreements about the use of lethal control to mitigate wolf attacks on livestock, and social conflicts over the killing of wolves have increased significantly over the last decades (Blanco 2017, Sánchez 2018, 2021b). The situation has been exacerbated by the country's decentralised structure, which consists of 17 “autonomous communities” (ACs), represented by their own governments. Wolf management used to fall under the jurisdiction of each AC, including monitoring, hunting and culling quotas and wolf damage compensation (Trouwborst 2014, Blanco 2017). However, in September 2021, the Spanish Ministry for the Environment (MITECO) approved the inclusion of the populations north of the Duero on the National List of Wild Species in Special Protection Regimes (LESRPE) (La Moncloa 2021a). This status renders wolves strictly protected across the country and implies an unusual imposition of power over wolf management by the national government over the ACs. The decision was extremely contentious and is the subject of an ongoing and polarised debate in social media and policy forums as its legal and practical implications are being negotiated (Navarro 2021).

4.3 Theoretical approach

4.3.1 Governing for human-wildlife coexistence

This research builds on previous efforts to unpack the meaning and components of resilient human-wildlife coexistence (Redpath et al. 2015, Carter and Linnell 2016, Pettersson et al. 2021a). This scholarship has illuminated how different understandings of nature and HWIs shape how coexistence is experienced. For instance, whether coexistence is evaluated through a lens of anthropocentrism (aimed at preserving the welfare of humans) or bio/eco-centrism (emphasising the intrinsic value of wild animals and natural processes), and whether humans are seen as a part of or apart from nature (Ives and Kendal 2014, Vucetich et al. 2018). These factors also influence people's perceptions of coexistence policy. Approaches considered acceptable by those impacted can enable stewardship and “conviviality” on one end of a spectrum, notwithstanding people's attitudes to particular species (i.e. “positive coexistence”), while the other is characterised by negative livelihood

impacts and feelings of imposition or injustice (Büscher and Fletcher 2019, Bhatia 2021, Pooley 2021). Stewardship is thus intimately tied to legitimacy, here defined as “the extent to which people believe a particular institution, rule, or order is socially acceptable and should be followed” (Read et al. 2019: p. 39), according to its outcomes, procedures and/or alignment to value systems (Suchman 1995, Cashore 2002). Positive coexistence is contingent on reciprocal trust and accountability, which allows constituents to rely on managers to deal effectively and fairly with the issues at hand, and for practitioners to devolve power and account for different knowledge- and value systems within conservation planning (Armitage et al. 2012, Sjölander-Lindqvist et al. 2020, Saif et al. 2022). Positive coexistence is thus both a policy goal and a continuous process of conservation governance. When such reciprocal interactions are achieved, it can elicit a multitude of possible coexistence pathways according to how priorities for a particular system are ranked, enabling a transparent appraisal of different policy options (Leach et al. 2007, Fazey et al. 2016)).

4.3.2 The role of discourse in coexistence policy

How coexistence is conceptualised within policy is determined by environmental discourses concerning the responsibility, resources and expertise needed to conserve and restore nature. Discourse is here conceptualised as an “ensemble of ideas, concepts and categories” through which an environmental problem is socially constructed, and which “is produced and reproduced through an identifiable set of practices” (Hajer 2003: p. 3, 2006). Since discourses construct the knowledge, relationships and conduct relevant for policy-making, they are both a product and medium of power (Dryzek 2013, Biermann and Mansfield 2014). Examining discourses is therefore crucial for understanding the governmentality of conservation: meaning the ways in which “the truth” about nature is formed, by whom and how it legitimizes particular forms of control to the exclusion of alternatives (Rutherford 2007, Winkel and Leipold 2016). One example is in how species are evaluated and categorised. Conservation status is determined by modelling of population size, range and genetics, a process that involves estimations and value judgements steeped in uncertainty due to the complexity of socio-ecological systems. This includes previous states of the population (e.g. what baseline is referred to) and how many there should be (according to their perceived role/belonging within the system and estimated extinction risk) (Wilhere 2008, Marris 2021). These judgements and resulting categorisations have a significant impact on

regulation, funding streams and the perceived legitimacy of conservation programmes (Campbell 2012).

We use argumentative discourse analysis (Hajer 2006, Scott 2017) to illuminate why certain coexistence pathways have become dominant in Spanish policy, and the consequences for people and wolves. This type of analysis has been used to study how wolves become entangled with other socio-environmental issues (Dorresteijn et al. 2016, Niedziałkowski et al. 2021) and how different truth claims are weaponised to influence management (von Essen 2017). Informed by this work, we focus the analysis on storylines, understood as condensed statements summarising complex narratives within a discourse (Hajer 2006). More than just an assemblage of beliefs, storylines provide normative orientation, prescriptions for action and serve as a nexus for discourse coalitions: groups of actors who share the same worldview or ways of interpreting an issue (Fischer 2003, Dryzek 2013: p. 10). Within environmental governance, coalitions nowadays often take the form of public-private partnerships, in which NGOs, advocacy groups, corporations and the state collaborate (formally or spontaneously) to resolve an issue (Jepson 2005, Rutherford 2007). In policy-making, storylines are often adopted as tools of political strategy, enabling solutions to be “rendered technical” (Li 2019: p. 33), i.e. viewed as apolitical or “common sense” rather than about contestable priorities, values and pathways. The influence of a particular discourse can be understood by examining the degree to which it dominates how a particular domain (policy, society) conceptualises the world (*structuration*) and whether it solidifies into institutional arrangements (*institutionalisation*) (Hajer 2006).

4.4 Methods

We collected two sets of data to discern the main storylines and their influence on Spain's coexistence policy. The first focuses on the perceptions of local communities at three states of wolf presence: permanent, recent return and possible return in the near future. The data were collected on-site from January-December 2020 through key-informant interviews (approximately n = 30/site) and participant observation (ethical approval AREA 19-018). The study sites and informants were purposefully selected to encompass a wide range of perspectives on Spain's expanding wolf

population and its socio-ecological implications (table J1, Appendix J). This dataset also includes the published outcomes from two ongoing wolf conflict mediation initiatives (GCG 2018, Blanco et al. 2021, Salvatori et al. 2021) and debates from online and published media (table J2, Appendix J). The second dataset consists of publicly available documents (legal opinions, draft decrees, reports and management plans) which outline the institutional framework for protected species in Spain, and that introduce, explain, or justify the new wolf protection decree (see table 4.1). These documents were purposefully collected upon the adoption of the decree in September 2021 and reviewed in August 2022.

Table 4.1. Data sources collected and analysed for the research.

Source, time of collection	Data collected	Focus (to understand)
Qualitative data collected at case study sites, January-December 2020.	Interviews: - Sanabria/La Carballeda (29) - Oriente de Asturias (31) - La Vera (29) - Independent (3)	Participants' problem statements, aspirations and proposed policy interventions for coexistence.
	Participant observation: - Shepherding - Tourist events - Village events (incl. wolf meetings, manifestations) - Wolf monitoring and research tasks - Conferences, webinars, courses	Local experiences of coexistence and how it is portrayed/debated in local//regional settings.
	Documentaries and filmed media , emitted by: - Agricultural organisations: 2 - Conservation NGOs: 3 - Regional media: 3	How coexistence discourses are communicated to the public by different stakeholders.
Outcomes from participatory processes, 2020-2022.	- Declaration: Campo Grande Group: "toward the coexistence of the Iberian wolf and extensive stock-raising", 2018. - Report, EU Regional platforms for coexistence Ávila (Blanco et al. 2021, Salvatori et al. 2021)	How coexistence is portrayed and what actions are proposed, within wolf conflict mediation initiatives.
Legal and policy documents related to the inclusion of wolves on LESPRES, 2021-2022.	- Opinion of the Scientific Committee, (Comité Científico 2020). - Legal opinion on the draft decree and related correspondence (MITECO 2021a). - Ministerial order (decree) to include wolves on LESPRES (BOE TED/980/2021). - Coexistence strategy (draft and final version): "Strategy for the coexistence of rural. activities with the wolf and its conservation", (MITECO 2021b, 2022).	How coexistence is negotiated and institutionalized within national policy agendas, and how this is shaped by discourse.
Monitoring of discourses in public media and academic forums, 2020-2022.	Newspaper articles, social media content and organisation web pages, on the topics of wolf and coexistence.	How coexistence discourses (on wolves and/or rural issues) are debated and communicated to the public.

The data were analysed in two steps. First, the content of transcripts, field notes and mediation documents were examined through thematic network analysis, using the NVivo software. We first established a basic coding structure consisting of three categories: *What-*, *how-* and *why-*arguments, which detailed stakeholders' visions for coexistence, proposed approaches to achieve those visions, and the priorities, assumptions and worldviews underpinning them. Through an inductive and iterative process, the structure was populated with data-driven codes of reoccurring arguments (claims and warrants) within the dataset, subsequently grouped into themes (storylines) (Attride-Stirling 2001, Hyatt 2013), see table J3, Appendix J. The final structure was transferred into a data sheet with relevant codes on the X-axis and informants on the Y-axis, which revealed patterns in the data and enabled us to discern the main discourses and the coalitions reproducing them. In the second step, we analysed the policy documents through the established coding structure, tracing the presence or absence of the identified storylines. Particular attention was paid to modes of legitimation, the argumentative practices through which policies and interventions were justified within public and institutional domains (Hyatt 2013).

Through this convergence of information, we identified three overarching coexistence discourses. The full range of available discourses and their respective influence on policy is beyond the scope of this paper. We also refrain from evaluating whether the associated coexistence pathways will deliver sustainable livelihoods and/or natural systems. This would be an interesting area for future research, which can be informed by this paper. We selected these discourses below because they were widely present and reproduced within public, policy and academic debates, and because they propose three distinct perspectives of what coexistence means and how it should be achieved. Their main storylines and argumentative structures are described in the next section of the paper, contextualised by how they relate to dominant environmental governance discourses in the international policy domain. Quotes from primary and secondary data are used to capture the nature and nuance of the storylines.

4.5 Three visions of coexistence

The discourses can be represented as positions along a continuum of ideas about how to (re)establish a sustainable human-nature relationship, who should be the target of regulation and control (who should adapt to whom), and according to whose knowledge (who is the expert). This stems from a general agreement on: 1. the existence of certain socio-environmental issues in rural Spain, including zoonotic diseases, wildfires, depopulation and growing ungulate populations, 2. the incompatibility of unprotected livestock in areas with established wolf populations and 3. that wolves and livestock must be spatially and/or temporally separated. Whether and how separation is achieved, by whom and at what level (e.g. through physical barriers around individual flocks vs. enforcement of “wolf-free” areas regionally) generates trade-offs for wildlife, livestock and people. The discourses illuminate how these trade-offs are viewed and justified, according to three distinct philosophies of nature. Below, we elucidate the two storylines within each discourse that most clearly explain these philosophies (table 4.2).

Table 4.2. Perceptions of coexistence from case study A-C and public debates.

Category	Radical wolf-protectionist discourse Bio/eco-centric coexistence – nature focus	Radical high nature-value farmland-discourse Anthropocentric coexistence – landscape focus	Pragmatic coexistence discourse Bio-cultural coexistence – system focus
STORYLINE 1 Coexistence focus and approach	a. Humans must protect, respect and adapt to wolves in order to ensure their full recovery and autonomy → traditional conservation governance: control people to ensure the flourishing of wolves and restoration of nature	b. Wolves must be managed in a way that avoids or minimises their impact on peoples' activities and livelihoods → human-centred governance: control wolves to enable sustainable rural livelihoods and restore traditional landscapes	c. Wolf management must continuously be negotiated and adapted according to social and ecological needs → coexistence governance: control and safeguard both wolves and local ways of life according to local conditions
Normative and utilitarian rationale	- Killing wolves and restricting their range is morally wrong - Wolves should be restored to previous ranges (all of Spain) to reverse human wrongdoing and restore nature	- Prioritising wild animals over the well-being of people and their livestock is morally wrong - Traditional practices are crucial to maintaining landscapes and their socio-ecological values. Wolves should be restricted/removed if they cause harm	- Moral and ethical concerns regarding both wolves and rural livelihoods are valid and must be acknowledged - Both wolves and rural ways of life must be preserved, but not necessarily everywhere or in the same place
Evaluation of wolf conservation status	Threatened because: - High rates of unreported mortality (e.g. accidental and deliberate killing) - Iberian wolves are genetically and spatially isolated - There are fewer wolves than officially claimed, regional managers and scientists exaggerate to enable lethal control	Of no major concern because: - They are generalists, intelligent and reproduce quickly - They have survived despite centuries of persecution - There are more wolves than officially claimed, managers/conservation NGOs deliberately underestimate to protect wolves	In a favourable state because: - The population is stable/is increasing - Wolves are resilient and can readily recover if space and resources are provided - Official figures are robust but more careful monitoring is needed to address current knowledge gaps
Favoured expertise and policy orientation	- Coexistence should be managed according to ecological criteria - Wolf protection should be nationally harmonised and enforced (top-down) - Increased vigilance, prescriptive and punitive measures are needed to deter illicit killing and fraud	- Rural contexts cannot be understood and managed by external actors - Local people are the experts and should decide where and how wolves could be conserved (bottom-up) - Legal frameworks should be made more flexible so as to not interfere with traditional management	- Traditional knowledge must be incorporated within conservation to sustain biological and cultural heritage - Participatory and place-based approaches are needed to increase transparency and harmonise conservation targets with local realities
Economic responsibility	- Society is already paying for farmers to protect their livestock through EU agricultural subsidies (CAP) - Livestock protection should be a condition of receiving economic support	- Costs of external (urban) preferences regarding wildlife conservation should not be imposed on rural communities - Any coexistence funding should be in addition to existing subsidies	- Rural communities must adapt, but be supported by public funds since they are already vulnerable - Funding streams should be tailored to the local context and address the local vulnerability

<p>STORYLINE 2</p> <p>"Nature" and human-wildlife dynamics</p>	<p>a. Protecting and reintroducing wolves across Spain can help restore nature by restoring disturbed ecosystems (the Yellowstone effect).</p>	<p>b. Traditional agricultural landscapes (and their biodiversity) have been created and maintained by people and livestock for millennia – wolves disturb this balance</p>	<p>c. The interactions between wolves and other wildlife within human-dominated landscapes are context-dependent, both have a role to play</p>
<p>The ecological function of wolves</p>	<ul style="list-style-type: none"> - Ungulate overpopulation and zoonotic disease is caused by the lack of a top predator (wolves) - Wolves enhance forest recovery and healthy, self-sustaining ecosystems (trophic cascades) - Wolves prefer wild prey over livestock and natural over human-dominated areas 	<ul style="list-style-type: none"> - The return of wolves impedes grazing, which exacerbates scrub expansion, wildfires and system deterioration - There are more ungulates and diseases than ever, despite increasing wolf populations - Wolves are opportunists and will go for the easiest prey, i.e. livestock, which maintains artificially high wolf populations 	<ul style="list-style-type: none"> - More research is needed to monitor and understand the role of wolves in human-dominated landscapes - Human-managed resources (e.g. livestock, pets) and their presence impact wolves' ability to regulate ungulate populations
<p>Wolf population dynamics and management</p>	<ul style="list-style-type: none"> - Wolves are self-regulating (adapt according to the availability of natural prey) - Overpopulation is impossible - control is not needed 	<ul style="list-style-type: none"> - Wolves have access to human food sources and have no natural predators -The wolf population must be controlled to avoid overpopulation and "unnatural" behaviour 	<ul style="list-style-type: none"> - Wolves can adapt and flourish within human-dominated/modified systems, often despite hunting - Control may be needed in some contexts but should be selective
<p>Lethal control and hunting</p> <p>– impact on wolves and livestock depredation</p>	<ul style="list-style-type: none"> - Lethal control is counterproductive since it disrupts packs, making them more likely to attack easy prey such as sheep - Hunting and culling are a threat to wolf populations and incompatible with wolf conservation 	<ul style="list-style-type: none"> - Killing wolves is the most effective measure to prevent and/or decrease damage: fewer wolves = less damage - Hunting and culling wolves maintain wolves' fear/respect of humans, promoting separation of human and wolf activities/territories 	<ul style="list-style-type: none"> - Some form of lethal control may be needed <ul style="list-style-type: none"> a. but should only be carried out by governing institutions, not hunters (case B and C) b. through culling and sport hunting, since it provides income for local communities (case A) - Hunting and/or culling decrease tensions with livestock owners and do not harm the overall wolf population
<p>Livestock protection (dogs, fences, shepherding) and damage compensation measures</p>	<p>... are applicable and effective across Spain.</p> <ul style="list-style-type: none"> - If not applied, or if ineffective, it is because of a lack of knowledge or "professionalism" of the farmer - Losses are minor and can be compensated through payments for verified wolf predation 	<p>... are often unviable/ineffective, and always highly time- and resource intensive, which makes their imposition deeply unfair</p> <ul style="list-style-type: none"> -Wolf damage to livestock is significantly underestimated (most kills are not found, reported or verified) - Compensation claims are a bureaucratic burden and do not reflect the true value of the damage 	<p>... are context-dependent and measures must be tailored to local conditions</p> <ul style="list-style-type: none"> -100% effectiveness of any measure is unlikely, and there are often trade-offs which are difficult to measure - Damage compensation is necessary but only as a complement to other forms of economic support

4.5.1 The radical wolf protectionist discourse

The first set of storylines (1a and 2a in table 4.2) represent a bio/eco-centric interpretation of coexistence. Their origins can be traced to Spain's early environmental movement, which emphasized wilderness preservation and the conservation of certain flagship species (i.e. "mainstream" conservation (Brockington et al. 2008)). An overarching theme in this discourse, detected in both interview data and public debates, was a framing of people as apart from natural systems and activities such as agriculture and hunting as a disturbance to their "natural" state. *"In Asturias, the mountains should be covered by forests, but it is all meadows. Green, very pretty, but it should be forests. And it [the forest] isn't there because of the farmers"* (Local naturalist, case C). Coexistence was often used as a metaphor for a (re)wilding of rural landscapes, with more space for nature-led processes. It set out a normative orientation wherein people (rural communities) should step back and divert to activities with a smaller environmental footprint, such as wildlife tourism. Wolf-watching in Sierra de La Culebra (case A), was frequently cited as a proof of concept by informants both within and outside the area (see Pettersson et al. 2021a). In order to achieve this vision, it was the *human* in the "human-wildlife equation" (Pooley 2021) that was to be restricted and controlled, while wolves should be afforded maximal autonomy. This was warranted (2a) by a widely held conviction that there were fewer wolves than officially claimed and that wolf reintroduction would restore "healthy" ecosystems by "re-balancing" the food chain, often citing trophic cascades associated with wolf reintroduction in Yellowstone (see Ripple and Beschta 2012). Any form of lethal control was strongly opposed, which provided a purpose (strict protection of wolves) and a common adversary (those who authorise and carry out killing) which united discourse participants. The storylines were often couched in scientific terms and based on cherry-picking of academic papers, e.g. citing those supporting that wolf control increases damage to livestock (e.g., Wielgus and Peebles 2014), while omitting those that refute it (e.g., Poudyal et al. 2016, Kompaniyets and Evans 2017), see table 4.2, 2a.

Farmers were often portrayed as incapable of grasping this knowledge, and untrustworthy as custodians of nature and wildlife: *“the shepherds don’t understand anything about the biology of the wolf. They don’t have any biological or scientific education, and they are very susceptible to believing the myths and legends”* (civil servant, case B). In line with mainstream conservation ideas, a top-down governance approach was favoured, rendered technical through strict and centralised protection of wolves, punitive measures to deter illicit killing and prescriptive livestock protection measures. Farmers unwilling or unable to comply were considered “unprofessional”, and their potential disappearance from the landscape was seen as inevitable or as a necessary development.

Storylines 1a and 1b were only evident among a small number of local residents, civil servants and tourism operators within our case studies. However, they were strongly represented in national debates by conservation NGOs (WWF Spain n.d., ASCEL 2021), published media (Krause 2021) and in agendas of left-leaning political parties (PSOE, PODEMOS 2016, Díaz 2020). These actors constituted a discourse coalition which adopted various legitimating practices to justify and institutionalise their agenda, with considerable success. The majority was spearheaded by members of the organisations ASCEL and Lobo Marley, who are known for their radical pro-wolf activism. Activities included repeated lawsuits against institutions responsible for lethal control (ASCEL 2018, Camazón 2020) and an “alternative” evaluation of the wolf’s conservation status, which found significantly higher mortality rates than official figures (Sánchez et al. 2017). Members have also been involved in several academic publications, e.g. suggesting that the average pack size of Iberian wolves is 4.2 (Fernández-gil et al. 2020), which can be contrasted with the 8.5 and 7.2 found by López-Bao et al. (2018) and Nakamura et al. (2021).

4.5.2 The radical “HNVF”-discourse

The second set of storylines (2a and 2b) provided a more anthropocentric interpretation of coexistence. It is rooted in ideas of traditional and sustainable use of nature (Manfredo et al. 2020, Pereira et al. 2020) and

high-nature value farmland (HNVF) (e.g. Eichhorn et al. 2006, Torralba et al. 2016). HNVF has become a prominent strand in Spanish conservation, with growing recognition of the role of pastoralism in sustaining ecological, aesthetic and cultural values of certain landscapes (MAPAMA 2016, San Miguel et al. 2016). Using a reversed logic of HWIs, this discursive regime defended traditional farming from an environmentalism that was perceived misanthropic and “Disney-fied” and regarded rewilding as a form of green-cloaked colonialism. In a similar vein, shepherds and free-roaming livestock (not wolves) were seen as the keystone species of the landscape. *“On top of the trophic pyramid is the cheese, because it is thousands of years old [and represents] the inhabitants of the area, who remain here with their stories. [...] that is more important than the number of [wolf] packs.”* (Civil servant, case B, regarding the area's emblematic dairy sector). The wolf was viewed as an opportunist that was incompatible with traditional uses, and that was in no need of protection. Conversely, protectionism was seen as misguided, promoting artificially high wolf populations that forced them to infringe on human territory and predate on livestock. Wolf presence was thereby associated with the same ecological “imbalance” as above, but for opposite reasons: embodying the drivers of land abandonment, depopulation and the lack of institutional support for rural livelihoods. *“It [the wolf] has more rights than us [...] It is all well and good that they protect it, but people have to come first.”* (Shepherds, case B).

Coexistence was interpreted as a state wherein wolf populations (i.e. the *wildlife* in the equation) were conditioned by the terms of local resource systems. Restoring “balance” and coexistence entailed continuous lethal control and instant retaliation to livestock depredation to suppress population growth and maintain wolves’ respect of human boundaries: *“If we hit it hard every time it attacks, they will stop attacking. [...] The ecosystem tells us the truth, and within the ecosystem, you have to include us [the people].”* (Farmer, case B). A more flexible and autonomous approach to wolf governance was therefore promoted, as it was considered impossible to understand and rapidly respond to rural concerns “from an office in a city”

(see 2a, and GCG 2022). Prescriptive livestock protection was strongly rejected for being locally unviable, resource intensive, or unfair.

Within our case studies, this set of storylines was primarily found among farmers and village residents, most notably where wolves had returned, and where people had had a negative experience of this process (Pettersson et al. 2021b). The arguments have also been described in other research on wolves in northern Spain by Marino (2019) and Ottolini et al. (2021). On a national level, the storylines were represented by agricultural organisations (e.g. UPA, 2020) and political parties aiming to attract rural constituents (e.g. VOX 2021). In order to counter the protectionist discourse, this coalition distributed damage statistics and images of livestock depredation in the media and relayed stories of farmers' trauma and economic strife (e.g. El Fielato 2019, Pomarada and Ramos 2020). However, the radical HNVF discourse had limited representation in institutional and academic domains, despite the increasing adoption of scientific rationality to justify their claims (e.g. Valladares 2020). The lack of acknowledgement was interpreted as an institutionalised disregard for rural forms of knowledge: *"our problem is that when these theories [about trophic cascades] are supported by someone who has studied, they become more credible. Ours isn't written anywhere, so they cannot be defended."* (Shepherd, case B).

4.5.3 The "pragmatic" discourse

The third set of storylines (3a and 3b) was characterised by democratic pragmatism (Dryzek 2013) and constructed as the middle-ground between the above-described discourses. This discourse stemmed from disillusionment with the current coexistence strategy, which has demonstrably failed to halt polarization among social groups. These storylines were therefore less focused on past baselines and idealised future visions, and more on what might address practical issues faced at local and regional scales. The landscape, and peoples' role within, were usually seen through a biocultural lens, emphasising the interconnections between natural and cultural heritage. However, changing wildlife value orientations and socio-political contexts for the countryside, and the need to adjust policy

accordingly, were also acknowledged (e.g. Gouriveau et al. 2019). Within this discourse, wolves did not symbolise a cause or solution to environmental problems, but rather a political lightning rod between urban and rural constituents: *"we live in a country where everything becomes radicalised. [...] there are people who want to kill them and people who see the wolf as [if] from Eden. They say that it fills a role in the food chain. I don't think so. The food chain in the wild is very altered. [...] Wolves come close to the villages, they eat from the trash."* (Civil servant, case A, also described by García Hernández et al (2019)).

Coexistence was conceptualised as a state wherein different groups were able to reconcile wildlife and livestock priorities according to the local context, and where the costs and benefits of living with wolves were distributed fairly. Because of this, storylines 3a and b were often adopted to advocate for wolf zoning according to habitat suitability, support for place-based livestock protection and economic benefits for wolf areas (e.g. certification for "pro-biodiversity lamb", FQH 2020). This pathway requires controlling both the human and wolf element within the system, which was warranted by the wolves' positive population trend: *"I think that from now on we have reached a state of maximum [...] There is no need for there to be wolves in all of Spain like there was 200 years ago. [...] it is the farmers that we most of all need to maintain "content", in order for them to accept that they have to live with wolves indefinitely."* (Wolf biologist, case A).

Storylines 3a and b were prevalent in interviews with residents (including shepherds) from case A, and among academics and civil servants. Case A informants also tended to be in favour of continued sport hunting, since it was considered economically efficient and beneficial to local communities (Pettersson et al. 2021a), while case B and C informants tended to favour culling by the administration (see 3b). The pragmatic view could often be attributed to the informant's exposure to the local practicalities of HWIs: *"I try to not remove wolves. They fulfil a function, but in farming areas, if there is pressure, I remove wolves because the farmer is a citizen that also needs to be protected. And secondly, the wolf, even though you extract some of the*

population it doesn't really affect it." (Civil servant, case B). This sentiment was manifested in the regional management plans of both Asturias and Castile and León (JCyL 2016, GPA 2019), although participatory and proactive measures have hitherto not been successfully implemented (Pettersson et al., 2021b). These were instead operationalised through a coalition of stakeholders, including academics and NGOs, who had taken it upon themselves to mediate in the conflict over wolves, with varying degrees of success. Such initiatives, including dialogue platforms, have multiplied over the last decades, primarily at the regional level (GCG 2018, Salvatori et al. 2021). A recent example is the province of La Rioja, where a roundtable of stakeholders, including the regional government, has successfully agreed on a roadmap for human-wolf coexistence (Gobierno de La Rioja 2022).

4.6 The national coexistence strategy

The 2021 decree to strictly protect wolves across Spain sparked both celebration and outcry, as well as confusion over what it meant and the criteria on which it was based. This can be explained by Spain's complex institutional framework for wildlife management and the many ways in which the wolf population is evaluated and categorised. The decree was preceded by changes in these categorisations, initiated by pro-wolf NGOs and national institutions. In the following section, we briefly explain the categories and trace how the protectionist discourse became structured and institutionalised into Spanish policy.

4.6.1 Wolves' conservation status

Similar to other European countries, Spain assesses species extinction risk and conservation needs at different scales according to different criteria. The most widely accepted is provided by the IUCN Red List (<https://www.iucnredlist.org/>), although it has no legal implications. In the most recent assessment of the Iberian wolf population (Spain and Portugal), it was described by Boitani (2018) as "large (about 2,500 wolves) and expanding towards the south and east" and listed as Near Threatened, corresponding with the assessment by Blanco et al. (2007). According to the

Habitat Directive, member states must ensure “favourable conservation status” (FCS)¹ for species included in its annexes (Article 1) and re-evaluate their status every six years (Article 17). Failure to achieve FCS generally implies a ban on exploitation, such as hunting, until the status is restored (The European Commission 2021), although the guidance is somewhat ambiguous (Epstein et al., 2016, 2019). Spanish wolves have been consistently been assessed as FCS in previous reports (EIONET 2013), which permitted areas north of the Duero river to maintain their practice of sport hunting and culling. However, in the last Article 17 report (concerning 2013-2018), MITECO changed its assessment to “unfavourable-inadequate” (EIONET, 2019), even though the population had not shown a reduction.

Wolves are also regulated by Spain's national wildlife conservation framework (Law 42/2007 and BOE-A-2017-2977). This framework comprises the Spanish Catalogue for Threatened Species (CEEAA), which contains only two categories, "Endangered" and "Vulnerable"; and the List of Wild Species in Special Protection Regimes (LESRPE) which includes those "worthy of particular attention and protection based on their scientific, ecological, cultural value, notwithstanding their conservation status" (BOE-A-2017-2977). Anyone can nominate a species for inclusion, which is then evaluated by a scientific committee appointed by MITECO. Populations on Annex IV of the Habitat Directive (including wolves south of the Duero river) are incorporated automatically into the LESRPE, while wolves to the north of the river (Annex V) remained excluded until 2021. All populations on LESRPE are strictly protected.

4.6.2 Changing wolves' protection regime

The 2021 decree was contingent on political buy-in from the national government and support from a majority of the ACs. This was achieved through a number of events that can be linked to the protectionist coalition,

¹ meaning a “situation in which a species is prospering in terms of both quality and quantity, and is likely to continue to do so in the future” (Epstein 2016).

coalescing in 2019. The most influential was wolves' new "unfavourable" status in the Article 17 report to the European Commission. The modification was motivated by poor genetic diversity and high levels of non-natural mortality which, according to the report's authors (unknown public officials from MITECO), risked surpassing the population recruitment rate (EIONET 2019). The assessment was based on "improved knowledge" (not on new census data), among which was cited the previously mentioned evaluation by Sánchez et al (2017). This is noteworthy since this evaluation has not been peer-reviewed, contradicted official data on wolf mortality (Menéndez 2018) and was conducted by a group with a clear agenda (i.e. strict wolf protection). Consequently, the rigour and validity of the new status assessment have been questioned (see Menéndez 2018, MITECO 2021a). In October 2019, ASCEL submitted a request to MITECO for the inclusion of all Spanish wolf populations on the CEEA as "Vulnerable", based on the criteria of a reduction of historical range by more than 50% in the last 100 years. Failing the former, they also suggested wolves' inclusion on LESRPE, based on their "cultural, scientific and ecological significance" (Comité Científico, MITECO 2020, Durá Alemañ 2021). In February 2020, the scientific committee rejected the CEEA request due to insufficient evidence², but recommended the inclusion in the LESRPE. However, the committee warned that the inclusion criteria were subjective and risked causing "inconsistencies in LESRPE" (Comité Científico, MITECO 2020).

Based on this verdict, MITECO, which since 2020 has been headed by a left-leaning PSOE and Podemos coalition, decided in favour of including wolves in the LESRPE (La Moncloa 2021a, 2021b). This triggered various bureaucratic procedures to implement the decision. This included votes in the Commission for Natural Heritage and Biodiversity, consisting of representatives of each province, where it was won by a one-vote majority

² A recent review of historical records indicates that the Spanish wolf population has been severely scattered and fragmented since the 1850s and that the actual reduction of their range was approximately 27% (Nores and López-Bao 2022), rather than the 70% as claimed by ASCEL.

(MITECO 2021a). Nevertheless, it was opposed by Asturias, Cantabria, Castile and León and Galicia, the northern autonomous communities (ACs) which together harbour 95% of Spain's wolves (Navarro 2021). They appealed the decree on the basis that it lacked consensus, economic considerations and procedural and scientific rigour, concerns that were also raised by academics and wolf conflict mediators (e.g. Majadas Andray 2021, Ottolini and Manzano 2021). The main opposition party (People's Party, PP) sided with the HNVF coalition in their outright rejection of the decree (Grupo PP 2022), and the populist far-right stated that the decision was "an assault against rural Spain" (VOX 2021).

However, the structuration of the protectionist discourse proved stable, which can be discerned in MITECO's legal opinion (2021a), where storylines 1a and 1b are used to defend the decree. For instance, it refers to the Article 17 report to disapprove northern ACs' management approach and accountability for "not offering the desired results". Their practice of culling and hunting, the opinion states, "entails the de-structuring of the packs, the reduction of their chances of survival and even the increase of damages". Thus, opposition notwithstanding, the decision was formally approved and came into force in September 2021 with decree BOE TED/980/2021. A new National Wolf Conservation Strategy was produced, authored by "MITECO's experts on the species" and "organisations and entities involved in the management of the species" (ongoing mediation initiatives are not mentioned or consulted) (MITECO 2021: p. 4). In order to improve public tolerance and coexistence, the strategy proposed damage prevention measures, harmonising payment schemes, raising awareness about the species and the consequences of illicit killing and increasing enforcement (MITECO 2021). Various drafts of the strategy were voted down until MITECO agreed to relax wolf culling requirements and offered to transfer 20 million euros to the ACs for compensation and prevention measures. This convinced Asturias (which is led by a left-wing government) to vote in favour, leading to the approval of the strategy on 28 July 2022 (MITECO 2022). Castile and León, Galicia y Cantabria, which are led by conservative

governments and which are home to 90% of Spain's wolf population, remained in opposition (Medina 2022).

4.6.3 Policy implications

Fifty years on from declaring the wolf a game species in Spain, the issue of their conservation appears more controversial than ever. The Iberian wolf population is one of Europe's largest and has proven highly adaptable to a range of landscape types, from mountains to agricultural plains (Blanco 2017, Boitani 2018). Yet paradoxically, there appears to be a growing perception that the population is on the brink of disaster. This sentiment has been actively promoted by the protectionist coalition. The narrative of the immanent disappearance of charismatic species is a well-established approach to mobilising public support for conservation (Jepson and Barua 2015, Hussain 2019). In Spain, it provided a temporality of urgency that was called upon to justify the hasty process of the protection decree (MITECO 2021a), which critics claim has foreclosed on the due political process (El Español 2021).

The decree and the "unfavourable conservation status" since 2019 means that hunting is prohibited in Spain, and that gaining approval for culling is more difficult and bureaucratically cumbersome. Lethal control remains contested among the public and in academic communities, and its role in improving tolerance for controversial protected species is inconclusive (Chapron and Treves 2015, Pepin et al. 2017, Liberg et al. 2020). However, it is important to consider decreased tolerance if hunting is banned where it has always been allowed. There are such concerns for some areas of northern Spain, where hunting and culling have been constant and highly valued tools in the eyes of local communities and managers (Marino 2019, Pettersson et al. 2021a). The new protection regime, therefore, raises the question of how local coexistence may persist given these changes. There are also fears of a backlash among certain groups as a reaction to the perceived extremism of the other side (Mech 1995), including protests and illicit killing, as was captured in a recent documentary from Asturias (<https://www.nunatakproducciones.es/salvajes-2021/>). Previous research

has argued that such acts of resistance may result from the perceived imposition of external priorities, threats to local ways of life and disillusionment with environmental institutions (von Essen et al. 2014, Cortes-Vazquez 2020, Skogen and Krangle 2020). As the dust settles, a thorough policy evaluation will be crucial to monitor the practical implications of the new decree on wolves and people.

4.7 Wider implications

The socio-political aftermath of the 2021 decision illustrates the importance of formulating policy through inclusive processes that maximise legitimacy (Hovardas 2020, Durant et al. 2022). However, our study supports earlier findings of a gap between research and implementation of these principles (Hartel et al. 2019, Marchini et al. 2021). In the following section, we discuss causes, outcomes and possible solutions to the implementation gap and how it relates to ongoing debates about nature and its conservation.

4.7.1 The pursuit of the “natural” in a changing world

Our findings indicate that Spain has continued to favour a form of conservation governmentality characterised by administrative rationalism, i.e. an instrumental “leave it to the experts”-approach (Dryzek 2013, Pooley et al. 2020). This can be illustrated by the limited representation of different knowledge systems in the evaluation of the decree proposal (the scientific committee consists exclusively of natural scientists), and the restricted ability of those most impacted by the decree to influence its structure and outcomes. This paved the way for the new wolf protection regime and the resulting coexistence strategy, which is centred on strategic goals for wolf conservation and on mediating impacts to and from wolves (e.g. protection of livestock and a crack-down on illicit killing), rather than building rapport with affected communities. Previous research has described the instrumental approach to HWIs as “the blind spot” of conservation governance, since it fails to address the epistemic and procedural causes of conservation conflicts (Madden and McQuinn 2014, Hansen et al. 2022). The consequences can be exemplified by the intensification of polarisation

following the decree's approval in Spain, and the outrage of groups who feel excluded and marginalised by the process (e.g. Díaz 2020).

Spain's new coexistence strategy indicates a prevailing influence of mainstream conservation ideas among many of the country's environmental institutions, and to some extent within EU's legal and economic frameworks. These ideas are based on a conceptualisation of nature that can be "known" by science and restored to more "natural" states, often referring to historical baselines where people had little or no influence over the system (Rutherford 2007, Iordachescu 2022). However, historical baselines are contentious and associated with interpretative uncertainties (which baseline to choose? According to what information?) (Corlett 2016, Nores and López-Bao 2022). Moreover, recent scholarship has demonstrated that the narrative of nature-driven recovery (by restriction of human activities) may be misplaced when anthropogenic influences have so fundamentally altered the ecosystem dynamics (Marris 2011, Webster 2022). This is evident in Europe, where wild species, landscapes and human practices have co-evolved over millennia, (Pretty et al. 2010, Bridgewater and Rotherham 2019), and where climatic and demographic dynamics keep altering the composition and function of many landscapes (Ellis 2013, Thomas 2017). For instance, several studies have found that wolf predation on livestock is a common occurrence also in areas where wild prey is abundant, which affects how they regulate ungulate populations (Ciucci et al. 2020, Recio et al. 2020). Scholars have therefore warned against "wishful thinking" and overly utilitarian approaches to justify species reintroduction. Nature is unpredictable, and failure to deliver promised benefits (such as preventing zoonotic disease) can exacerbate distrust and disputes (Mech 2012, Blossey and Hare 2022).

As wolves and other large carnivores continue to expand, and as the most suitable habitats become fully occupied, they will have to disperse through and eventually settle in increasingly humanized and agricultural areas (Mech 2017, Mayer et al. 2022). When coupled with social marginalisation and economic precarity in these areas, it could result not only in increased costs

and suffering of humans and domestic animals but also a more widespread backlash against conservation as an idea (Redpath et al. 2017, Pooley et al. 2020). For instance, studies from Germany and Sweden found that wolf attacks on livestock and/or hunting dogs were accompanied by a rise in far-right voting behaviour among rural residents, who saw the wolf as a synecdoche for wider processes of unwanted change (von Essen and Allen 2018, Clemm and Hohenberg 2022). The same phenomenon was found by Cortes-Vazquez (2020) in relation to a conflict over protected area management in northern Spain. Our research reveals similar tendencies, visible in how wolves have been appropriated as symbols of the "anti-rural" and neo-liberal among right-wing and conservative parties and voters, including among informants who expressed little antipathy against the wolves themselves. The fact that wolf protection may have become a point of distinction between the political blocks, and between different levels of government, makes decree and new coexistence strategy vulnerable to change with political alternation, and risk causing highly polarized protection/culling cycles (Mech 1995, Pooley et al. 2017).

This calls for shifts in how coexistence policy is negotiated and decided, with increased focus on local as well as regional dialogue and stewardship. As phrased by Lorimer (2015, 2), "Futures will not be like the past and will be shaped by human actions. Multiple natures are possible. Science will be complicit in its modification, and is political." Reflexivity is equally important within the realm of conservation assessments and policy advice. The latest Spanish Article 17 report illustrates how information can be produced or selected to shift categorisations according to political priorities. Similar concerns have been raised by Campbell (2012) regarding the classification of marine turtles on the IUCN Red List, and by Wilhere (2008) regarding Minimum Viable Population estimates. The risk of confirmation bias and the "bandwagon effect" is significant when decision-makers are made up of a narrow subset of expertise or interest (Khaneman 2015), and conservation scientists are not immune. Because of the lack of procedural transparency, it is difficult to hold institutions accountable if and when assessments are skewed or politically motivated. Given their significant influence on

legislation, policy and public attitudes, they can become a serious impediment to effective and socially just governance (Karieva et al. 2017, Skogen and Krange 2020).

4.7.2 Harnessing positive change for transformative coexistence governance

Disagreement over targets and figures, how they should be interpreted and by whom, is a leading cause of failed conservation programmes, in Spain and elsewhere (Redpath et al. 2015, Blanco 2017). These failures can be seen as an opportunity for transformative change among responsible institutions, for instance by forming trans-disciplinary partnerships that support co-management and co-production of relevant knowledge (Madden and McQuinn 2014, Bennett et al. 2017, 2022). Such diverse working groups can recognise and balance the historical, cultural and moral positionality and power of science (Goldman 2007, Rutherford 2007, Hartel et al. 2019). This is especially important for coexistence governance in traditional agricultural areas, which must account for the multitude of simultaneous and telecoupled challenges and processes, including climate change and marginalisation of traditional rights and heritage (Carter et al. 2014, Pettersson et al. 2021b, Lécuyer et al. 2022). If one set of interpretations and targets asserts its dominance over others in policy, it will be difficult to achieve local stewardship and harness solutions from within the communities themselves (Pascual et al. 2021).

However, national-level institutions and frameworks often have limited capacity to compromise and account for interests beyond their remit, which can constrain collaboration and knowledge co-production initiatives. For instance, Sjölander-Lindqvist et al (2020) describe how regional agreements have repeatedly been overthrown by the Swedish environmental agency, or through court cases wherein environmental NGOs invoke EU regulation to stop agreed hunting quotas. This mirrors our findings from Spain, where national ministries hitherto have been largely absent from and failed to recognise ongoing conflict transformation efforts, while being more malleable to the demands of pro-wolf groups. This is visible in the limited influence of

the pragmatic discourse on national policy, indicating a need to form closer ties between dialogue platforms and governing institutions. There are positive examples of how these barriers can be addressed, including the above-described initiative in La Rioja and the Wolf Dialogue Project, which is informing the new national wolf management plan of Denmark (Hansen et al. 2022). Other projects have adopted strategies from Peace Studies and diplomacy to address deep-rooted causes of conservation disputes (Madden and McQuinn 2014, Pound 2015, Bhatia 2021), while the involvement of citizens in the data collection, planning and evaluation processes has improved public trust in conservation programmes (Cretois et al. 2020, Marchini et al. 2021, Ostermann-Miyashita et al. 2021). The EU 2030 biodiversity strategy explicitly commits to supporting proactive approaches and stakeholder dialogue in ways that are “*suitable for our European multi-functional landscapes*” (European Commission 2021). This can be harnessed to integrate rural development, carnivore conservation and conflict transformation within the same funding programmes and management plans, and to redesign institutional structures accordingly (Hartel et al. 2019). This work will be crucial to prevent the cycle of protection and persecution that has tended to afflict large carnivore management in the past decades (Mech 1995, 2017, Kurashima et al. 2017).

4.8 Conclusion

Current socio-political transformations, in which nations and institutions strive to align with global sustainability agendas, provide an opportunity to advance transitions to more democratic and just forms of nature conservation (Bennett et al. 2019, Iordachescu 2022, IPBES 2022). Through our triangulation of qualitative methods, this research revealed that disputes over the strict protection of wolves in Spain are a proxy for deep-rooted disagreement over the meaning of nature and the role of people within it, as well as struggles over power and influence between both governing institutions and political parties. Our findings thereby add empirical evidence which supports the position that HWI planning must include in-depth approaches to understand “layers, histories and nuances” of coexistence,

and consider "how and where people and wildlife will be able to share the landscape in the long term, and what legal and development frameworks are needed to enable this" (IUCN HWCTF 2020).

In order to advance "positive" forms of coexistence, it is crucial to establish social infrastructures for public deliberation and reconciliation of different priorities and trade-offs and to increase transparency around the process through which associated policy pathways are selected and implemented (Leach et al. 2010, von Essen and Allen 2019). Accordingly, management plans must adapt and respond to both social and ecological variability, rather than attempting to impose standardised top-down solutions. In this research, we have highlighted examples which are identifying common goals, building on existing solutions and trialling novel ideas to promote co-adaptation of local communities and wildlife. These initiatives are not only more successful at transforming conflicts toward productive change, they are also more conducive to the messy and exciting endeavour of landscape restoration in the Anthropocene, where wildlife and local livelihoods will continue to blur the boundaries between human and natural spaces.

4.9 References for chapter four

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Chapter 5

Discussion and conclusion

5.1 Introduction

This thesis set out to advance empirical knowledge of the conditions that enable harmonious human-carnivore interactions (HCI) at various scales. Specifically, it aimed to *“understand the conditions of equitable and resilient coexistence at different states of LC presence, illuminate just transition-pathways towards mutual flourishing, and identify prevailing barriers to implementation”* (see section 1.4). Through its focus on coexistence, this research aim responds to the prominent shift within the academic field over the last decade: from analysing and addressing conflicts/intolerance, to understanding the whole range of possible human-wildlife relations from different angles (Carter and Linnell 2016, Büscher and Fletcher 2019, Pooley et al. 2020). The topic is of broad academic and public relevance given the continuing expansion of LCs in Europe, and the growing support for wildlife restoration and rewilding globally. Throughout the three results chapters (two, three and four), a diverse methodological toolkit was deployed to explore the conditions of human-wolf coexistence in the study sites, the processes that influence peoples' capacity to adapt to wolves and other transitions, as well as how nature and coexistence are socially constructed and governed in different settings.

The following chapter provides a synthesis of the outcomes of this research and how they contribute to the thesis aim. It is structured as follows: in section 5.2, the research objectives are revisited and related to the findings of each of the results chapters in turn. In section 5.3, cross-cutting themes are discussed, alongside the broader implications of the research project as a whole, focusing on how its theoretical, empirical and methodological contributions may be useful to advance transformative conservation agendas in Spain and beyond. Section 5.4 outlines the thesis limitations and makes suggestions for future research. Lastly, section 5.5 provides a summary of the contributions of this thesis, and outlines recommendations to advance the field of study and improve coexistence governance and policy.

5.2 Revisiting the research objectives/summary of findings

In chapter one, current trajectories and remaining research gaps within the HWI research field were identified, particularly in relation to the Spanish context, which informed the research objectives of the thesis (presented in section 1.4). The first of these objectives: *“to explore the underpinnings of coexistence in an area with long-established and comparatively harmonious human-wolf relations, as experienced and understood by local resource users and managers”*; was addressed in chapter two, by an in-depth case study of human-wolf interactions in Sanabria-La Carballeda. This was a particularly relevant case since it is internationally renowned for its high density of wolves and the co-occurrence of wolf hunting and wolf tourism. Analysing the ethnographic data through a coexistence lens revealed four main conditions of the area's relatively harmonious relationship with wolves.

Favourable habitat: Including low human and livestock density, high densities of wild prey populations and expanding forest/scrub cover. This has to some extent facilitated the spatial separation of human and wolf activities.

Sustained coping mechanisms: Including shepherding, night-time enclosure of livestock and widespread use of LGDs to protect livestock. These practices have evolved with the increasing wolf population, resulting in remarkable (and costly) numbers of LGDs. The continuous relationship, coupled with low damage levels, also meant that fear and hatred towards wolves were relatively uncommon. More recently it has led to a growing sense of local pride in the area's shepherds, because of their ability and skill to defend their livestock against wolves.

Managing wolves as game and compensating damages: The partial protection afforded by the Annex V regime enabled S-LC to maintain and become known for wolf trophy hunting, particularly within the SdIC hunting reserve. The practice provided some monetary benefits for local communities and (perhaps more importantly) gave people a sense that the wolf population was “under control”. The reserve was also responsible for paying wildlife damage compensation, which outside of the reserve was only available to those with insurance.

Tourism: The conditions for wolf observation in the wild and in captivity were particularly favourable in S-LC, primarily because of the topography and the sheer density of wolves, and because of the wolf visitor centre in Sanabria. In recent decades this has become an important source of income, and the wolf has become S-LC's distinguishing feature with which they attract tourists.

These conditions explained why S-LC's residents tended to see wolves as a legitimate part of the local fauna to which they had to adapt, whether or not they liked it. In terms of stewardship, it illustrated the significance of peoples' perceptions regarding the "nativeness" and benefit of a species and the ability to, if needed, regulate the population (i.e. that the species was not "untouchable"). These factors are often the most prominent sources of social tension when wildlife recolonise or are reintroduced to humanised landscapes (Redpath et al. 2015, Reed and Ceno 2015, Durant et al. 2019b). However, the analysis also identified several vulnerabilities and concerning trends that posed a risk to this convivial state in S-LC. This included lack of institutional support, since both attention and funding for coexistence were focussed in areas with negative interactions. The additional costs of raising livestock in a wolf area disadvantaged S-LC's pastoral cultures, which undermined their capacity to coexist in the long term. The findings illustrate that a broader approach to HWI management is needed, which in addition to addressing conflicts also promotes or amplifies functioning relationships and practices so that they can develop with ongoing transitions. This broader approach is also relevant to other conservation and restoration efforts, beyond Spain and beyond wolves. For instance, it can help project managers to identify the strongest candidates for strategic upgrading of conservation areas or expansion of rewilding initiatives (whether passive or active), in ways that build on positive momentum and maximise political and social palatability (Pringle 2017). As Spanish and European institutions ramp up their efforts to restore wild species and spaces (Díaz et al. 2021, The European Commission 2021), these positive examples are urgently needed to illustrate that coexistence can be favourable for both local people and wildlife.

Chapter three addressed the objective to "*describe the main components and prerequisites (i.e. local adaptive needs and capacities) of resilient coexistence, and explore how they are manifested at different states of wolf presence*". An extensive literature review distilled a novel theoretical

framework that supports the systematic identification and analysis of the conditions and processes which influence coexistence and co-adaptation. The framework consists of: effective institutions, large carnivore persistence, social legitimacy, low levels of risk and vulnerability; and was adopted to synthesise the findings from the three case study sites. The structure of the framework enabled the human-wolf interactions under study to be situated within their wider social-ecological context and to identify mechanisms that may alter coexistence capacities in each community, for better or worse.

The analysis illuminated that while the case study sites have very different local conditions for coexistence, such as favourable or difficult working conditions for LGDs and ability to capitalise on wolves, they share many underlying socio-economic and ecological challenges. These challenges, including depopulation and unfavourable market conditions, made the communities vulnerable to change and perturbations, including the increase or recolonisation of wolf populations. The systematic and qualitative research approach also enabled the distinction between people's attitudes towards wolf presence and their attitude towards wolf governance, which had different roles in driving positive or negative synergies between coexistence conditions. One of the biggest issues across the study sites was the lack of trust in the ability of governing institutions to support coexistence, which was exacerbated by negative experiences and examples from wolf return in Asturias and elsewhere in Spain.

The chapter illustrates that more proactive approaches are needed to increase adaptive capacities prior to the return of challenging species, such as wolves, and to pave the way for just transitions to their presence where conditions are favourable. HWI research has over the years identified a host of technical, economic and social mechanisms which can facilitate coexistence, including livestock protection and ex-ante payments (Linnell and Cretois 2018, van Eeden et al. 2018), but the recipe will be unique for each location. The most effective way to generate a locally adapted and accepted composition of these mechanisms is to develop them from within the community in question (Mathie and Cunningham 2003, Redpath et al. 2017). In the case study sites, some private initiatives are leading the way to such adapted solutions, such as the "biodiversity-friendly lamb" certification in Asturias. However, more work is needed to establish the mutual trust and the infrastructure required for knowledge co-production and collaboration at a national level. The chapter thereby supports and informs conservation

interventions based on active and ongoing local community engagement, which are increasingly promoted as a way to increase the social acceptance and sustainability of nature restoration projects (Durant et al. 2019b, Butler et al. 2021).

Chapter four addressed the objectives *“to explore future scenarios and aspirations for coexistence and rural nature, locally as well as in public debates, and the associated pathways toward them”* and *“to determine what priorities and forms of knowledge that are considered in coexistence governance and policy-making, and how this may shape local coexistence capacities.”* The juxtaposition of these objectives and the collected datasets enabled an interesting analysis of how coexistence as an idea was socially constructed, and the power-knowledge dynamics which determined how it became manifested in Spanish policy. 2021 provided an opportune moment for this research, given the policy shift from a flexible to a strict wolf protection regime in Spain.

The analysis illuminated three overarching discourses that were particularly influential: the radical pro-wolf, the radical high nature value farming (HNVF), and the pragmatic coexistence discourses. They were widely represented within the case study sites and public debates, and each had a distinct interpretation of and a pathway toward convivial relationships with nature and wolves. Coupled with the analysis of policy documents and grey literature related to the 2021 decision, this chapter revealed the prevailing dominance of "mainstream" conservation knowledge hierarchies within Spanish frameworks, as well as within the European Habitat Directive. These hierarchies underpin the governmentality of these institutions, making them more compatible with the types of arguments and solutions that are produced by the natural sciences, whether or not there is scientific consensus about them. This was visible in how the pro-wolf coalition successfully utilised the frameworks to advance their agenda, using crowd-sourced empiricism to generate necessary "evidence". The HNVF discourse on the other hand was rooted in traditional knowledge and experience, and based on the interconnected development of biological and cultural values. The type of nature produced by these interconnections, and the knowledge required to sustain them, have generally been considered less "natural" and valuable from a conservation point of view (Marris 2011, Lorimer 2015). While the pragmatic discourse is gaining traction on local as well as international levels (e.g. through the IUCN HWCCSG), it has been less

successful at establishing partnerships with the regional and national institutions that shape or implement policy. Coupled with public, political and juridical pressure by the pro-wolf coalition, this lack of cross-sectoral collaboration facilitated the approval of the strict wolf protection decree and the new coexistence strategy, despite widespread opposition, and led to the present situation of heightened polarisation. Unfortunately, this polarisation diverts attention from the many positive coexistence trends and initiatives that have emerged in Spain over the last decades, and from the goals and values that are shared between the discourse coalitions. These include sustainable food production, vibrant local communities and climate change adaptation.

Taken together, the three results chapters demonstrate how coexistence can be reinforced or disrupted by a range of political, psychological, economic and environmental processes, many of which have been neglected by traditional and species-focussed conservation governmentalities. The chapters thereby illustrate the importance of more systematic and trans-disciplinary approaches to the research and governance of HWIs, which co-produce knowledge with those impacted as well as those who have experience in sharing space with the species in question. It also illuminates how efforts to identify shared and mutually reinforcing goals can enable advancement beyond clashing philosophies of nature, and to create productive engagement among those who care the most about the future of the landscape in question.

5.3 The future of human-carnivore coexistence in Europe: Discussion and implications for research and practice

The general findings of this thesis suggest that there are reasons to be hopeful about the future of LCs, in Spain as well as in other parts of Europe. Most populations are stable or expanding, especially wolves, which can now be found even in densely populated countries such as Denmark and the Netherlands (Cimatti et al. 2021, Mayer et al. 2022). Their trajectory of recolonisation in both Europe and North America indicates that wolves do not need “wilderness” to survive, that they are able to also flourish within heavily modified systems and despite lethal control, which is practiced in different forms across both continents (Blanco 2017, Linnell and Cretois 2018). While species such as lynx and bears have more specialised habitat requirements, they are showing similar trends of expansion and adaptation

within humanised landscapes (Chapron et al. 2014, Ripple et al. 2014, Linnell and Cretois 2018). This suggests that the most important factor for continued LC restoration across these continents is to be protected from unregulated hunting. This protection is now increasingly widespread due to unprecedented levels of public, institutional and juridical support (Mech 2017, Manfredo et al. 2020). Yet concomitant with improved habitat conditions and increasing abundance of wildlife, conservation conflicts are becoming more frequent, serious and widespread as the boundaries between human(ised) and wild spaces become blurred (IUCN HWCTF 2020, Cimatti et al. 2021). This can be illustrated by the expansion of scrubby vegetation across previously open pastures in Spain, which brings both ungulates and their predators closer to human settlements. It also brings them closer to livestock and pets, which increases the risk of zoonotic disease transmission and depredation between wildlife and domestic animals. This explains why many (particularly western) cultures spent centuries extinguishing or separating wildlife into dedicated areas: sharing space is challenging and inconvenient.

These challenges are prominent also in other parts of the world, where the trends of LCs and other megafauna are more worrisome. Around 60% of the world's largest carnivores (15 kg and over) and largest herbivores (100 kg and over) are classified as threatened by the IUCN, and the available habitat for many species is shrinking rather than expanding as in Europe (Ripple et al. 2016, Malhi et al. 2022). Some of these species have limited capacity to adapt to human-altered environments, needing continuous wilderness areas or ecological corridors to maintain migration patterns, genetic diversity and find resources (Ehlers Smith et al. 2019). The situation is particularly acute in Sub-Saharan Africa, where the ranges of some LCs (including African wild dogs and cheetah) have declined by over 90% (Wolf and Ripple 2017), and where people who share space with them often are extremely vulnerable due to climate change, various forms of land dispossession and economic marginalisation (Misselhorn 2005, Brockington et al. 2008, Durant et al. 2022). These pressures exacerbate the competition over productive land between and among people and wildlife.

Yet from another point of view, 70% of countries in Africa have been classified as major/above-average performers in assessments of historic and relative efforts of LC conservation (Lindsey et al. 2017), and there is increasing recognition of the experience and accumulated knowledge of

many indigenous and local communities with regards to coexistence (Goldman 2020, Torrents-Ticó et al. 2021, IPBES 2022), from which European countries have a lot to learn. For instance, a study by Baynes-Rock (2015) in Harar, Ethiopia, found a remarkable form of coexistence between local communities and the spotted hyena (*Crocuta crocuta*), which calls into question the conceptual boundaries of human-animal relations. In Harar, the hyenas, which are often feared and reviled in popular culture, are welcome in the streets, fed and appreciated by the locals for providing protection from harmful spirits, with associated benefits for the hyenas.

Reversing the trend of human-nature separation reflects a change of normative preferences and environmental awareness in the public domain, which has significant impacts on the livelihoods, well-being and security of humans as well as non-humans (Linnell and Cretois 2018, Pooley 2021). In Europe, coexistence at this scale is uncharted territory: most communities are not adapted to the presence of LCs, and those who were in the past often depended on a combination of spatial separation and lethal control measures to ensure that LCs were kept at bay. For instance, a systematic and government-sanctioned poisoning campaign in Spain, which largely substituted previous hunting and trapping, was estimated to have caused the death of 2000-3000 wolves annually in the mid-nineteenth century (Nores and López-Bao 2022). As many of the shepherds in my study sites emphasised: Preventative methods such as LGDs are resource intensive, and in the past, they were primarily a complement to killing LCs.

That fact was often omitted by those who claimed that farmers and shepherds had “lost their memory and ability” to protect livestock, and who promoted “going back to the old ways” of coexisting with LCs. This was a widespread opinion among the pro-wolf coalition, explored in detail in chapter four. This argument also overlooks or takes for granted the trade-offs for those who successfully defend their animals against wolves. The findings from study sites A and B suggest that they are significant: shepherds reported that they were economically and/or practically unable to leave their flocks for vacation or leisure, and farmers spoke of the constant, emotionally draining worry about wolf attacks while livestock was out of sight. Those who had experienced attacks described the trauma of finding terrified, injured or mutilated animals (including LGDs), which was made worse by the complicated bureaucratic procedure to prove the incident was caused by wolves and receive some form of compensation. A popular

strategy to counter such negative perceptions and experiences has been to quantify the damage and put it in a wider economic context (illustrating that losses are minor in the grand scheme of things) (e.g. Fernández-Gil et al. 2016). Such strategies have had limited or opposite effects on local tolerance, particularly if the same actors are striving to prevent any action which may harm LCs (Mech 2012, Pooley 2021). The findings from across the study sites examined in this thesis thereby support the view that any attempt to improve stewardship whilst ignoring or diminishing traumatic events, however few in number, are bound to end in failure (Crespin and Simonetti 2018, Risvoll and Hovelsrud 2021).

Sharing space inevitably leads to difficult ethical and practical trade-offs between LC conservation, animal welfare and human livelihoods and security, since attacks on livestock and death of LCs can never be completely avoided (Mech 2017, Linnell and Cretois 2018, Bruskotter et al. 2021). The return of LCs into humanised areas thereby produces “ecologies/landscapes of fear”, not only for wild prey species, but also for people, livestock and the LCs themselves. This fear or apprehension operates at various scales, affecting individual lives, relationships and the physical landscape (Ripple et al. 2014, Gieser and von Essen 2021). These trade-offs have often been unacknowledged, and must be confronted and publicly deliberated for coexistence to be socially just and durable (von Essen and Allen 2018, Bruskotter et al. 2021). This illustrates the crucial importance of research and practice which learns from past and current experiences of living with “problematic” wildlife, but which is also open to new or alternative ways of leading convivial lives with nature (Büscher and Fletcher 2019, Pascual et al. 2021). As discussed throughout chapter one, coexistence research and governance are moving towards integrated approaches that emphasise equitable and dynamic co-adaptation, rather than simply decreasing negative impacts to and from wildlife. Thanks to the growing influence of conservation social science in the field (e.g. Bennett et al. 2017, Margulies and Karanth 2018, Pooley et al. 2020), knowledge is expanding on the procedural, moral and pragmatic elements of legitimate policy, as well as the social and economic prerequisites of resilience and stewardship. This thesis contributes conceptually and empirically to this area of research in the following ways:

5.3.1 Supporting the coexistence approach

By conducting case-study research through a coexistence lens, the thesis empirically demonstrates the negative impact of the narrow and retroactive focus on conflict that has dominated conservation governance. In Spain, it has constructed a policy reality that neglects existing convivial relationships. In practice, this has meant that a disproportionate amount of attention and funding for wolf conservation has been dedicated to negative interactions, while positive or neutral relationships are left vulnerable to ongoing socio-environmental transitions. In S-LC, the effect is clearly visible in the limited support for the area's shepherds and farmers. Most of those interviewed expressed a strong sense of pessimism about the future of their livelihood and practices, which contrasts the popularised view of them as a proof that sharing space with wolves is possible and beneficial (Martínez 2019, De Llano 2020). S-LC thereby exemplifies that ensuring human tolerance and successful conservation of LCs is distinct from achieving positive coexistence (Pooley et al. 2020, Bhatia 2021).

For practitioners, these findings draw attention to the positive momentum which could be generated by promoting livelihood resilience in areas with established convivial lifestyles and practices. This could be achieved through monetary benefits to local people, a public distinction of their products and services, and by braiding their knowledge into policy and planning. For instance, if a positive trend for S-LC's pastoral cultures could be achieved, with increased well-being notwithstanding its remarkable density of wolves, it would provide a much-needed example to counter the image of the wolf as "the beast of waste and desolation" (see page 85) amongst Spanish farming communities. However, as with any case study (Yin, 2014), S-LC should not be used as a blueprint. The area has a unique set of conditions, among which the permanent presence of wolves stands out. This condition removes the ambiguity of whether the species belongs in the system or not, and what influence it may have on local wildlife, livestock and people. Ambiguity about belonging, impact and utility is often the main point of contention in areas of wildlife reintroduction, particularly when reintroduction is facilitated or engineered by people (Corlett 2016, Lee et al. 2021). This can be exemplified by people's feelings toward the reintroduced red deer in S-LC, which among some interviewees was considered more problematic than the wolf. The moral legitimacy afforded by continuous presence is difficult to retrofit, even if other conditions and practices are replicable, and even if the

species used to be present in the area. Instead, it is legitimacy through procedures and outcomes that could become extrapolated from one case to another (Suchman 1995, Cashore 2002), such as governance systems which purposefully promote and celebrate people's coexistence capacity.

For researchers and policymakers, the findings illustrate the valuable knowledge that can be gleaned by considering the whole range of available HWIs within a given system. While numerous studies have emphasized the need for this work from a theoretical standpoint (e.g. Peterson et al. 2010, Pooley et al. 2017, Lozano et al. 2019), it is only in recent years that empirical studies of positive and neutral relationships have begun to appear (e.g. Dorresteijn et al. 2016, Hovardas et al. 2017, Toncheva and Fletcher 2021). Chapter two expands this emerging knowledge base through its in-depth study of S-LC, while chapter three adds conceptually by proposing a framework for resilient coexistence. The analytical power of this framework lies in its capacity to focus attention on the conditions that could allow both humans and animals to flourish in the context of broader systemic change, rather than merely reducing conflict in a particular place. This responds to calls to "widen the aperture on what to consider when thinking about coexistence with wildlife" (Pooley 2021: p. 5). Through its structure, it facilitates the systematic identification of adaptive needs and capacities, thereby paving the way for further research and planning from this angle. The framework builds on conceptual work by Carter and Linnell (2016), adding depth and structure to each of their highlighted conditions by incorporating perspectives from the environmental change and governance literature (Smit and Wandel 2006, Nelson et al. 2007). In particular, it illuminates the factors that determine communities' ability to deal with risk and perturbations: namely exposure, sensitivity, and adaptive capacity. This explicit focus on community vulnerability is novel in the HWI context and proved highly useful to explain local attitudes and experiences of coexistence in the study communities. The framework thereby complements the emerging toolbox for planning, monitoring and adaptive management of coexistence and nature restoration projects (e.g. Hovardas 2020, Butler et al. 2021, Marchini et al. 2021, Durant et al. 2022).

5.3.2 Emphasising proactive coexistence governance

Another important contribution of the thesis is its innovative approach to studying wolf expansion across its different stages. Combined with the above-discussed theoretical framework, it produced novel temporal and

procedural perspectives on how LC presence can influence communities in different ways, even before they have arrived. The thesis is therefore of particular interest for practitioners in areas that are faced with the return of "problematic" species, a situation that will be increasingly widespread given the positive trends for many wildlife populations and global commitments to nature restoration (UNEP 2019, The European Commission 2021). Each of the results chapters highlights different aspects of the challenge involved in the process: chapter two of acknowledging and maintaining coexistence capacities; chapter three of paving the way for LC return where it is about to happen, and the negative impacts of failing to do so; and chapter four of accommodating and embracing the plurality of ways in which coexistence can be interpreted and governed.

A common theme throughout the results chapters is the need for more trans-disciplinary, proactive and inclusive approaches to coexistence governance, which respond to and builds on local variation and ways of being in nature (Hovardas et al. 2021, IPBES 2022). Funding for capacity building, dialogue platforms, collaboration and integrated development programmes is available through Europe's agricultural and rural subsidies (The European Commission 2021), but it is currently up to each member state to decide how to distribute these funds. The thesis supports earlier findings of the prevailing knowledge- and institutional silos in conservation management (Hartel et al. 2019, Marchini et al. 2021), and indicates that policymakers may need more support and guidance to use these funds effectively and equitably. The case-study approach of chapter three, with or without the aid of the framework, can be used by researchers and practitioners to underpin planning and social learning initiatives, for instance as a basis for participatory scenario analysis and knowledge sharing among stakeholders at different coexistence states (e.g. Hovardas 2020, Thorn et al. 2020). Application of this approach could for example be considered for the golden jackal (*Canis aureus moreoticus*), which is currently in a state of rapid expansion across Europe. Their appearance has led to debates about legal obligations and potential impacts on wild and domestic animals, e.g. competition with the red fox (*Vulpes vulpes*) and impacts on the poultry sector (Spasov and Acosta-Pankov 2019, Hatlauf et al. 2021). Important perspectives about this process are likely to emerge by bringing together stakeholders from different stages of this expansion to discuss challenges and opportunities for collaboration. Such work would improve the knowledge

base for proactive research and conservation projects and inform current initiatives (e.g. EU's Regional Platforms for coexistence and the IUCN HWCCSG), which seek to improve the science-policy interface of HWIs. This work could advance efforts to make LC coexistence governance transformative rather than palliative, and aid practitioners in building institutional partnerships for mutually reinforcing restoration of biodiversity and culture.

5.3.3 Revealing barriers to the incorporation of diverse value systems in coexistence policymaking

The growth of the conservation social sciences has not only contributed insights into more equitable ways of conserving wildlife but has also highlighted the importance of scrutinising conservation as a social institution and practice (Brockington et al. 2008, Sandbrook et al. 2013, Bennett et al. 2017). Within the HWI field, this work has been crucial to challenge techno-managerial approaches to conflict and prevailing ideas about human-nature separation (Redpath et al. 2015, Massarella et al. 2021). Critical work on coexistence is still at a nascent stage since it is a relatively new field. How the concept is defined, and what behaviours are deemed compatible or incompatible with coexistence, are influenced by the same discourses and practices that are shaping conservation and environmental management more broadly (described by Dryzek 2013 and Büscher and Fletcher 2020). Tracing whose interpretations become dominant or suppressed, and how these are manifested in policy, is therefore important to reveal epistemic injustices and challenge problematic structures. This work is crucial to ensure that the policy goal of coexistence does not become a rebranded version of “business as usual” conservation (Fiasco and Massarella 2022).

Through the combined analysis of ethnographic data, policy documents and media debates, this thesis provides a significant empirical contribution to this area of research, building on previous contributions from Dorresteijn et al. 2016, von Essen 2017, Niedziałkowski et al. 2021. The findings of the analysis, presented in chapter four, offer insights on three influential discourses in Spain, and how they shape the way wolf presence is experienced and managed at different scales. It reveals that peoples' understanding of coexistence is closely tied to their preferences and aspirations for rural nature, e.g. whether they value “wilderness” or HNVPs, which determines whether they see the activities of humans or wildlife as key to restoring the landscape. This supports and expands the work of

Marino (2019), who drew similar findings from her work on wolves and bears in northern Spain. Combining the findings across the thesis study sites moreover reveals that many local farmers, practitioners and residents are pragmatic to trade-offs: viewing coexistence in ways that are compatible with emerging principles for biocultural and inclusive conservation governance (GCG 2018, Salvatori et al. 2021, IPBES 2022). This information is of particular importance to policymakers and practitioners since it highlights existing ideas and processes that can pave the way for holistic coexistence governance (as conceptualised in sections 1.2.3 and 1.2.4.).

The thesis also explores the presence and absence of the discourses in public debates and in policy documents about the 2021 wolf protection decree. The study (presented in chapter four) is the first to analyse critically the policy change and how it relates to processes and categorisations of international conservation frameworks (the IUCN Red List and the Habitat Directive). The analysis revealed knowledge hierarchies within Spanish conservation institutions, which favoured the interpretations of the wolf protectionist coalition over those of the pragmatic and HNFV coalitions. These hierarchies were underpinned by assumptions of "unbiased science" and apolitical expertise. This enabled the use of unsubstantiated and contested scientific and pseudo-scientific information to change the conservation status of Spanish wolves on the Habitat Directive (from "favourable" to "unfavourable"). Since this categorisation influences national regulation, it enabled pro-wolf groups (fronted by the NGO ASCEL), to justify strict protection, even though the wolf population is expanding (MITECO 2016), and notwithstanding the strong social opposition of impacted groups.

These findings contribute important insights to the literature which critically evaluates and works to transcend existing conservation paradigms (e.g. Niedziałkowski et al. 2021, Pascual et al. 2021). In particular, this chapter expands on previous findings of the limitations of Spanish and European conservation frameworks in providing effective coexistence governance, and in considering diverse values on which species and types of nature that matter (Blanco 2017, Epstein et al. 2019, Iordachescu 2022). These knowledge hierarchies have implications for how different groups are represented in decision-making, which in Spain was illustrated by the power asymmetries between discourse coalitions within decision-making processes. For conservationists and policy-makers, chapter four draws attention to the need for more reflexivity and awareness of one's own

positionality, and increased transparency regarding the assumptions and priorities which underpin assessments and policy (see Wilhere 2008, Nores and López-Bao 2022). This is important to increase public trust in the official data and resulting management plans and to enable them to be challenged and enriched by local knowledge systems (Goldman 2020).

Chapter four also provides insights for those working on conflict mediation at grassroots and international scales. By illuminating the limited influence of the pragmatic discourse in Spanish policy, it indicates that more efforts are needed to engage national institutions within dialogue platforms. Recent work has shown that strengthening these connections can be significant in informing management plans and strategies, thereby improving the legitimacy of policy outcomes and processes (Marchini et al. 2021, Hansen et al. 2022). There is enormous potential to build on existing platforms for social learning and dialogue and to amplify positive experiences and practices such as those discussed throughout this thesis. This is not only important to achieve locally adapted solutions for coexistence, but also to align national frameworks with global commitments to value plurality and equity within environmental governance (IPBES 2022). When state-centred conservation agendas are harmonised with bottom-up concerns for local identities and knowledge, they can result in a collective sense-making of a particular context and a common vision of its future (Whitehouse 2015, Williams 2018).

5.4 Limitations and future research directions

An important part of the spiralling research design and post-structuralist lens utilised in this thesis was to continuously reflect on the role of the researcher and the possible limitations of the research approach. As specific study limitations were discussed within each chapter, this section will outline general limitations in relation to the generalisability and rigour of the findings, from the perspective of me as a researcher. It will also propose directions for future research which could build on the theoretical and empirical contributions of this thesis.

5.4.1 Scope and sampling

There are many challenges inherent in ethnographic case study research, particularly in selecting sites that can produce interesting and generalisable findings, and in recruiting participants that are willing and able to illuminate

local conditions and phenomena (Yin 2003, Bauer and Gaskell 2016). The multi-case study design and the federalist structure of Spain (wherein each autonomous community (AC) has its own governance structure), added to these challenges. There was no generalised method or format for the ACs in providing data, such as on depopulation and wolf damage statistics and compensation, and information about wolf presence and management approaches through time was often missing (as discussed by Nores and López-Bao 2022). The ACs also differed in the transparency of information: some providing open access to research and policy documents, while in others I had to rely on local contacts to facilitate this information. This limited my ability to compare details, processes and conditions across the sites, although my collaboration with national researchers helped fill in or explain the gaps.

The scope and extent of the case studies and the data collection were also limited by the Covid-19 pandemic, which broke out as I was wrapping up fieldwork in my first study site. The initial time plan was based on two to three months per site, followed by a second round consisting of scenario analysis in focus groups. The aim was to co-produce and explore pathways under different demographic, governance and LC expansion scenarios with local stakeholders. This phase was unfortunately cancelled, since gathering in groups was unsafe at this time. The pandemic also complicated data collection in the communities due to recurring lockdowns, social distancing and cancelled events. Fortunately, the low case rate during the summer enabled me to complete a similar number of interviews and activities (such as accompanying shepherds) at all sites. Under normal conditions, it would have been desirable to incorporate more sites at each of the coexistence states, interview more informants from a wider section of society, and adopt a more targeted approach to researching aspirations for the future (i.e. the focus groups). Yet given the constraints, the adopted strategy was considered the most suitable to understand and illuminate local narratives, experiences and interpretations of coexistence. To some extent, the pandemic also enriched the study. For instance, it illustrated the vulnerability of Spain's strong dependence on tourism, which caused significant economic issues in all study sites as travelling ground to a halt. It was particularly interesting to observe in S-LC, where wolf-watching and hunting activities in a normal year enable people to capitalise on the wolf, and which constitutes a significant proportion of the communities' economic turnover.

Finally, while I did return to my case study sites to validate and disseminate my findings and traced the 2021 policy process from the draft decree to approval (see section 1.6.5 and chapter four), the thesis offers only a snapshot of human-wolf interactions in a constantly changing and evolving situation. Due to data limitations, it also relied on people's memories and perceptions of the past to describe changes over time. While the use of local knowledge is an important mechanism to overcome data limitations (Newing 2010, Kurashima et al. 2017), the picture will always be partial and influenced by peoples' interpretations and shifting baselines (Higgs et al. 2014, Corlett 2016). The topic and case-study structure of the thesis would have been particularly conducive to qualitative longitudinal research (Neale 2020), and elements of this approach were included in the initial research design. Given the above-discussed limitations, it was not possible to repeat the interviews within the scope of the project, but I remain in contact with local groups and plan to return as part of future research efforts. This continued engagement will be particularly important to elucidate how the new strict wolf protection decree impacts local coexistence capacities across the study sites.

5.4.2 Generalisability

Throughout this thesis, the unique conditions for human-wolf coexistence at each of the study sites have been emphasised, as well as the context-dependency of human-wildlife interactions more generally (Redpath et al. 2015, IUCN HWCTF 2021). The limitations inherent in ethnographic research and the use of perceptions to illuminate local phenomena have also been discussed (see sections 1.6 and 1.7). It is therefore worth reflecting on the empirical and theoretical generalisability of the findings: meaning whether the characteristics of a particular case are typical of a population, if they can speak for a wider context, and whether they offer insights about how variables interact or relate to each other (Berg and Lune 2014, Bauer and Gaskell 2016). The purpose of the research design was to lay bare patterns, conditions and processes which influence peoples' ability and willingness to coexist with wolves. Thus, the main contribution of the thesis does not lie in offering an overview of attitudes or a "list of ingredients" for coexistence, although each of the results chapters does offer interesting insights in this regard. Instead, it is its structure of key considerations for situational analysis that is of general relevance to researchers and practitioners. The generalisability of this thesis, therefore, lies in the

approach to identifying common themes and interconnections across the study sites, and in the use of a coexistence lens to discover and illuminate functional HWIs (as explored in chapter two). In developing the theoretical framework (chapter three) and illustrating the utility of discourse analysis (chapter four), the thesis paves the way for further research on how these socio-ecological and power-knowledge processes might shape coexistence capacities elsewhere, as discussed in the above section (5.3). While this contribution is not in the shape of particular indicators or a specific theory of change, it can inform their creation or complement models that already exist (e.g. Hovardas 2020, Durant et al. 2022).

Various steps were taken to ensure the rigour of the conditions which constitute the coexistence framework (chapter three) and their applicability in other settings. In particular, drawing upon a broad body of scholarship to contextualise local narratives within the wider academic debate (presented in sections 1.2 and 3.2) and discussions with stakeholders from the local to the international level (see Table G.1, appendix G). However, HWI research is constantly evolving, and both the research lens adopted in the thesis and the field itself are influenced by prevailing paradigms, which are not static. The thesis is also focussed on the European context, since comparing international governance models and conditions were beyond the scope of the research. There are certainly significant differences between continents with regards to coexistence, including colonial legacies, economic resources and characteristics of LCs, as briefly discussed in section 5.3. Other interesting differences include attitudes to trophy hunting in Europe (which is often very negative among the public) vs Africa and the US (Lozano et al. 2019, van Houdt et al. 2021). Caution is therefore advised when drawing on the empirical contributions regarding “what works” in Spain to inform policy elsewhere. As mentioned repeatedly, interventions such as LGDs, sport hunting or product certification schemes could be counterproductive in a different context to the study site in question. Trans-disciplinary teams and bottom-up, iterative processes to identify and frame locally adapted solutions are therefore particularly important when using the framework and/or thesis case study approach to identify locally significant coexistence conditions.

5.6.2 Future research

Coexistence research

All over the world, there are countless communities and cultures that have evolved or learned to live alongside challenging or dangerous wildlife. Research on neutral and harmonious/convivial relationships has the potential to transform conservation governance since it draws attention to this diversity of knowledge systems and ways of living in nature, many of which have been overlooked or undervalued by conservation institutions (Büscher and Fletcher 2020, Massarella et al. 2021). By adding perspectives from Spain, this thesis has contributed both empirically and theoretically to this emerging area, but follow-up studies could reveal more nuance and corroborate initial observations in the case study sites. For instance, whether attitudes to introduced red deer really are more negative than to wolves in S-LC, as findings from study site A indicated.

On a general scale, convivial relationships remain largely unexplored, especially with less charismatic wildlife (Lozano et al. 2019, Pooley et al. 2020). There is enormous potential to learn from these relationships, and future research should continue to explore and amplify this knowledge-base while ensuring openness and respect for local and indigenous contexts. Ethnographic approaches, such as those adopted for this thesis, will often be the best way to understand the complex, multi-level interconnections between people, wildlife and the landscape (Rust et al. 2017, IUCN HWCTF 2020). They are also more conducive to knowledge co-production and illumination of the multiple ways in which nature is valued, which is a priority of post-2020 climate and biodiversity agendas (IPBES 2022).

Longitudinal, proactive and landscape-scale research

As mentioned in the above section, there is a need for more longitudinal research to trace how communities (human and non-human) are influenced by the (re)colonisation of LCs and other future-shaping trends, and the impact of particular policies or interventions. Future research could for instance depart from this thesis to study the impact of the 2021 wolf protection regime on the case study sites, how people and wolves recover from the major 2022 wildfire in study site A (Álvarez and Navarro 2022), or the return of wolves to site C (the first officially reported sighting occurred in January 2022 (Armero 2022)). As discussed in section 5.3, the framework and case study approach of the thesis could also be used to study interactions between other human- and non-human communities elsewhere. Such studies would benefit from bigger and more inter- and transdisciplinary research teams that was possible within this thesis, in order to illuminate

interactions at the landscape scale. This includes ecological succession, predator-prey dynamics, impacts on the well-being of people and domestic animals, and the effectiveness of certain interventions (Kuijper et al. 2016, Linnell and Cretois 2020, Durant et al. 2022). Studying these processes over time is essential to advance proactive coexistence governance and to corroborate the increasingly contested theory and rationale of large carnivore restoration and reintroduction (Recio et al. 2020, Webster 2022).

More research is also needed to guide the dedication of resources for LC restoration and coexistence. At present, there is a tendency to focus both attention and economic resources on areas that are emblematic for LC coexistence or conflict (such as S-LC and Asturias, study sites A and B), or because of a desire/decision by someone to bring LCs back (such as lynx to the UK or wolves to Ireland (Hawkins et al. 2020, Butler et al. 2021, Sands 2022)). Yet it may be more important to study and support places where this will happen naturally, such as La Vera (study site C). Such proactive research could be guided by a number of questions, including: Where are LCs most likely to turn up within the near future? What are the conditions like in this location and can they be improved? What do local communities know about the species and its potential interaction with the system? This research, which could benefit from the framework presented in chapter three, could inform zoning and planning efforts, and the (re)distribution of resources to those who are or will be bearing the highest costs of coexistence.

Research on effective and inclusive governance

Results from chapter four demonstrate that there are prevailing power-knowledge hierarchies that prevent inclusive coexistence governance, at both the Spanish and European levels. Further critical work, for instance through discourse analysis, could provide more nuance to those identified in chapter four. This can inform research on how to bridge silos and improve transdisciplinary collaboration (Hartel et al. 2019), and improve guidance for national policy-makers on how to braid diverse knowledge systems. Existing initiatives for collaborative fact-finding and decision-making, which facilitate the generation of locally adapted solutions, have been referred to throughout this thesis (e.g. GCG 2018, Hovardas 2020, Salvatori et al. 2021). Yet research on the contribution of such initiatives to conservation agendas is still at a nascent stage, and questions remain on how to reconcile their outcomes with top-down agendas and targets, and how to empower

communities to negotiate their interests across scales (Kothari et al. 2013, Durant et al. 2022). This research will also have to consider the challenges inherent in democratic systems and how to address them. This includes how to avoid the "tyranny of the majority" while adhering to the legitimate concerns of non-local people regarding the well-being of non-human life (Lockwood 2010, Vucetich et al. 2018). This dilemma can be exemplified by the 2021 protection decree in Spain, which was described in chapter four. It was approved by a one-vote majority among the autonomous communities (ACs), a majority consisting of those without wolves, while those with wolves voted against it. Approaches that devolve power to local rights holders remain questioned (López-bao et al. 2017, Vucetich et al. 2021), which illustrates the need for more empirical evidence to support democratic decentralisation (Kothari et al. 2013, Sjölander-Lindqvist et al. 2020).

Finally, there is a need for further work on animal geographies and multi-species ethnography to illuminate non-human considerations of coexistence (e.g. Baynes-Rock 2015, Margulies and Karanth 2018, Marris 2021). This approach was not within the scope of this study and is particularly challenging with elusive species such as the wolf. Nevertheless, they are of increasing importance to advance discussions of interspecies justice and challenge ideas about who can speak for non-human interests, and how (Fry et al. 2022).

5.5 Conclusion

This thesis used an ethnographic approach to explore what fosters and perpetuates human-wolf coexistence in rural multi-use landscapes. The analysis drew on a post-structuralist sensibility and an inductive approach to illuminate conditions and processes that were deemed relevant by the communities themselves. In doing so, the thesis adds to the growing body of literature examining the diversity of ways in which people and wildlife can share space, and how to address the biodiversity crisis through just and inclusive processes that also provide human development outcomes. It considered both how people interpreted coexistence with wolves, how relationships had changed over time, how they were influenced by social, economic and environmental processes, and the envisioned pathways to sustainable human-nature interactions in the future. Triangulating these multiple perspectives provided novel findings on the conditions that underpin

durable coexistence, the procedural and recognitional elements of legitimate policy, and the barriers which prevent its implementation.

Results from this thesis demonstrated that coexistence in multi-use landscapes rarely implies a win-win scenario, even where effective damage prevention measures were established (such as S-LC), or where there were financial incentives (such as product premiums in Asturias). For traditional resource users, living with wolves usually requires additional resources to protect their livelihoods, less flexibility and freedom, and increased emotional strain from worry and fear. Given simultaneous socio-economic challenges, it explains why these groups, across Europe, tend to be opposed to recolonisation or strict protection of LCs, and why instrumental approaches to coexistence (such as compensation and fencing) are insufficient to achieve just and sustainable outcomes. However, the findings from the study sites also indicated a widespread pragmatism and willingness to accept coexistence under certain conditions. Shepherds and farmers were often acutely aware of biodiversity and climate crises and recognised the need for or inevitability of change.

At the same time, a growing number of grassroots and international efforts at promoting dialogue and co-management, both in the study sites and elsewhere around the world, are enabling local resource users to raise their concerns at regional and national levels, and in some cases reach consensus with other interest groups about how to tackle them. The need for dialogue was widely acknowledged in the case study sites, and those who partook in conflict mediation projects (GCG 2018, Salvatori et al. 2021) were united by their will to achieve better outcomes for both people and wildlife in their area. The thesis thereby supports earlier findings that multiple scales of governance, which build from the smallest level, are the most effective and equitable way to manage conservation issues (Kothari et al. 2013, Reed and Ceno 2015, Redpath et al. 2017, Sjölander-Lindqvist et al. 2020).

Participatory methods from the bottom up offer an opportunity to engage those who care the most about the landscape in question. It enables their sense of place to become a force for change of the systemic issues that are undermining biological and cultural diversity, which often share common drivers (Pretty et al. 2010, Madden and McQuinn 2014, Büscher and Fletcher 2020). This illustrates the transformative potential of adopting coexistence as a policy goal and research lens and using ethnographic methods to explore local relationships: it draws attention to the conditions,

capacities, and knowledge systems that are at the centre of stewardship for nature, and which enable locally generated adaptations to coexistence challenges. When knowledge about particular systems emerges through a process of co-production, where local perspectives are complemented or contextualised with scientific knowledge, it can improve both the robustness and legitimacy of the knowledge produced, which is a global priority of post-2020 biodiversity agendas (Pascual et al. 2021, IPBES 2022).

However, the thesis also identified epistemic and practical barriers at both regional and international scales, and a reluctance among various institutions to devolve power. This stemmed from a lack of trust between groups and institutions, inadequate structures for co-management and prevailing knowledge hierarchies within national and international conservation frameworks. Another problem was the disproportionate focus on the attitudes and behaviour of certain groups: in particular intolerant farmers and shepherds. By widening the aperture of the discourse analysis, the thesis revealed that the other side of the spectrum, i.e. radical pro-wolf groups, can be equally or more responsible for undermining coexistence. For instance in Spain, where their lobbying of the national government and repeated litigations against regional management approaches exacerbate polarisation and distrust between groups and levels of government. It has also perpetuated simplistic views and wishful thinking about the capacity of LCs to save “disturbed” ecosystems (Mech 2012, Webster 2022). Addressing these barriers and dogmas is crucial to ensure that coexistence does not simply become a rebranding or justification for conservation approaches which interfere with or displace local livelihoods in the name of saving nature (Brockington et al. 2008, Pooley 2021, Fiasco and Massarella 2022). The challenge of coexistence lies in identifying what specific forms of governance arrangements will work in particular locations, how to redistribute costs and benefits fairly and effectively, and for powerful institutions to relinquish control over how nature should be defined and valued (Adams 2015b, Brockington et al. 2018).

5.6 References for chapter five

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Appendix A Case study characteristics

Table A.1. Socio-environmental details about the case study sites.

SES KEY FACTORS	Location A	Location B	Location C
Case study focus area	Sanabria-La Carballeda, 1.996 km ² , Zamora province.	Oriente de (eastern) Asturias, 1.922 km ² , Asturias province (uni-provincial).	La Vera, 888 km ² , Cáceres province.
Elevation (MAMSL)	La Cabrera range, 800-1200	Cantabria range, 0-2600	Sierra de Gredos range, 400-2400
Landscape characteristics	Poor soils with deciduous forests (mainly oak, chestnut and holm oak), intermingled with conifer plantations, heathland, fallow, and pastures. Shrub (e.g. brooms, thyme, lavender and heather) on higher elevations ¹ .	Limestone peaks interspersed with Atlantic broadleaf forests (oak, holm oak, alder, ash and beech), biodiverse hay meadows (among the richest temperate grasslands in the world). Alpine pastures (“majadas”) intermingled with scrub (e.g. hawthorns) on higher elevations ²⁻⁴ .	Deciduous forests (mainly cork oak, holm oak and chestnut), intermingled with pastureland and productive terraced cultivations on lower elevations. Scrub (e.g. broom, heather, peat, creeping juniper) and pastures on higher elevations ⁵ .

<p>Protected areas and hunting reserves</p>	<p>Sierra de la Culebra Regional hunting reserve (67 000 ha). Lake Sanabria Natural Park (23 000 ha) Transfrontier Biosphere Reserve Meseta Iberica (106,934 ha), established 2015.</p>	<p>Picos de Europa national park (67 455 ha). Ponga Natural park (20 533 ha). I</p>	<p>Sierra de Gredos y Valle de Jerte Natura 2000 (69.529 ha). La Sierra private hunting reserve (13 908 ha).</p>
<p>Relevant large carnivores and herbivores present</p>	<p>Wolf, red deer (reintroduced in the 1970s), roe deer, wild boar ^{1,2}.</p>	<p>Wolf, bear (very few specimens), chamois, red deer, roe deer, wild boar ³.</p>	<p>Ibex, red deer, roe deer, wild boar ⁴.</p>
<p>Wolf population status</p>	<p>Continuous presence ^{1,5-7}.</p>	<p>Locally extinct in the northern part of the PENP in early 1960s, returned late 1980s. First reproduction detected in northern PENP in 1998 ⁸⁻¹⁰.</p>	<p>Locally extinct in 1960s ^{11,12}.</p>
<p>Current wolf population</p>	<p>Eight packs in Sanabria and the La Culebra reserve respectively (2018).</p>	<p>Six confirmed in the Oriente district, and an additional 4-6 within Picos NP ^{3,10}.</p>	<p>0 ¹³</p>
<p>Wolf conservation status (regional), pre 2021</p>	<p>Game species, Annex V of the EU Habitats Directive 92/43/EEC.</p>	<p>Not a game species, Annex V of the EU Habitats Directive 92/43/EEC.</p>	<p>Critically endangered, Annex IV Habitats Directive 92/43/EEC.</p>
<p>Wolf management plan</p>	<p>Yes: 2008, 2016, available online ^{8,12}.</p>	<p>Yes: 2002, 2015, available online ^{26,27}.</p>	<p>No plan has yet been approved ^{12,13}.</p>

Hunting quota	Yes. Extraction rate is 11-17% of the wolf population/year in Zamora (2019-2022), e.g. approximately 12 wolves/year in the SdIC reserve ¹⁴ .	None.	None.
Wolf culling	Yes, in cases of “special conflictivity” (i.e. extensive livestock damage), controls can be conducted outside of the hunting season, carried out by specialized personnel ² .	Yes, yearly quotas established under the wolf management plan. Outside of “management zones” culling can take place when considered necessary ³ .	Harming or killing wolves is prohibited, but there are exceptions to “prevent significant damage to livestock and hunting” ¹⁵ .
Human population (study areas)	Inhabitants: 8.408 Population density: 4,2 hab./km ² (2019).	Inhabitants: 53.203 Population density: 27 hab./km ² (2019).	Inhabitants: 24 438 (2019) Population density: 27.52 hab/km ² (2019).
Livestock mortality by wolves (region)	415 in the north in 2017. Decreasing trend since 2013 for sheep, stable for cattle ^{6,16} .	1051 (horses, cows, sheep and goats) in Oriente/Picos area in 2016. Slightly decreasing trend since 2012 on sheep and goats, stable or increasing on cattle ^{3,16,17} .	0
Use of livestock damage prevention mechanisms*	Widespread. Sheep accompanied by shepherds during the day and enclosed at night. LGDs used both for sheep and cattle, with recognized effectiveness ^{1,18} .	Moderate uptake. Some use of LGDs and night time enclosures for sheep and goats, less among cattle farmers ^{3,9,19} .	Some remaining within the goat sector (use of LGDs and night-time enclosures for protection from smaller predators). None for cattle.

<p>Wildlife damage compensation schemes</p>	<p>Compensation scheme in place since 1996. Damages to the north of Duero are compensated within the regional hunting reserves, approximately 100 000 € in 2017. Farmers within the rest of the territory are required to have insurance, within which 18 000 € was paid in 2017⁶.</p>	<p>Compensation scheme in place since 1997. Approximately 900 000 € granted for damages in 2018³ in the whole region of Asturias.</p>	<p>If natural recolonization of the wolf occurs, compensation for damages to livestock will be established according to the plan for species listed on annex II and IV of the Habitat Directive ¹³</p>
<p>Ex-ante payments, support for preventative mechanisms</p>	<p>Only to the south of Duero ⁶.</p>	<p>In 2018, € 89,250 was allocated to wolf damage mitigation in Asturias. 49 applications were made. Fences have been provided within Picos NP on some “majadas”, but maintenance of function has been an issue ³.</p>	<p>Incentives for the prevention of damage to livestock, such as the use of guardian dogs and support the employment of shepherds will be established according to above ¹³.</p>
<p>LC-related business and branding</p>	<p>4 local wolf-watching firms, 1 wolf interpretation centre managed by a public-private partnership (Iberian Wolf Center)²⁰. The area is known as “tierra de lobos” (lands of the wolf), and wolf branded products and services widespread through the region ^{18,21}.</p>	<p>None (explicitly designed around the LCs).</p>	<p>N/A</p>

* *Observational data, as there is no statistics of preventative mechanism uptakes from our study locations*

AP.1 References for Table A1

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Appendix B Ethics review form and approval

UNIVERSITY OF LEEDS RESEARCH ETHICS COMMITTEE APPLICATION FORM ¹



UNIVERSITY OF LEEDS

Please read each question carefully, taking note of instructions and completing all parts. If a question is not applicable please indicate so. The superscripted numbers (eg⁸) refer to sections of the guidance notes, available at <http://ris.leeds.ac.uk/UoLEthicsApplication>. Where a question asks for information which you have previously provided in answer to another question, please just refer to your earlier answer rather than repeating information.

Information about research ethics training courses:
<http://ris.leeds.ac.uk/EthicsTraining>.

To help us process your application enter the following reference numbers, if known and if applicable:

Ethics reference number:	AREA 19-018 (Amd Oct 2021)
Student number and/ or grant reference:	

PART A: Summary

A.1 Which Faculty Research Ethics Committee would you like to consider this application?²

- Arts, Humanities and Cultures (AHC)
- Biological Sciences (BIOSCI)
- Social Sciences/ Environment/ LUBS (AREA)
- MaPS and Engineering (MEEC)
- Medicine and Health (Please specify a subcommittee):
 - School of Dentistry (DREC)
 - School of Healthcare (SHREC)
 - School of Medicine (SoMREC)
 - School of Psychology (SoPREC)

A.2 Title of the research³

The Future of Human Carnivore Conflict and Coexistence in Europe

A.3 Principal investigator's contact details⁴

Name (<i>Title, first name, surname</i>)	Hanna Pettersson
Position	PhD researcher
Department/ School/ Institute	Sustainability Research Institute
Faculty	School of Earth and Environment
Work address (<i>including postcode</i>)	School of Earth and Environment University of Leeds, Leeds LS2 9JT
Telephone number	+4474 911 211 71

University of Leeds email address	eehlp@leeds.ac.uk
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A.4 Purpose of the research:⁵ (Tick as appropriate)

- Research
- Educational qualification: ***Please specify:***

- Educational Research & Evaluation⁶
- Medical Audit or Health Service Evaluation⁷
- Other

A.5 Select from the list below to describe your research: (You may select more than one)

- Research on or with human participants
- Research which has potential adverse environmental impact.⁸ ***If yes, please give details:***

- Research working with data of human participants
 - New data collected by qualitative methods
 - New data collected by quantitative methods
 - New data collected from observing individuals or populations
 - Routinely collected data or secondary data
 - Research working with aggregated or population data
 - Research using already published data or data in the public domain

- Research working with human tissue samples (*Please inform the relevant Persons Designate if the research will involve human tissue*)⁹

A.6 Will the research involve NHS staff recruited as potential research participants (by virtue of their professional role) or NHS premises/ facilities?

- Yes No

If yes, ethical approval must be sought from the University of Leeds. Note that approval from the NHS Health Research Authority may also be needed, please contact FMHUniEthics@leeds.ac.uk for advice.

A.7 Will the research involve any of the following:¹⁰ (You may select more than one)

*If your project is classified as research rather than service evaluation or audit and involves any of the following an application must be made to the NHS Health Research Authority via IRAS www.myresearchproject.org.uk as NHS ethics approval will be required. **There is no need to complete any more of this form.** Further information is available at <http://ris.leeds.ac.uk/NHSEthicalreview> and at <http://ris.leeds.ac.uk/HRAapproval>.*

*You may also contact **governance-ethics@leeds.ac.uk** for advice.*

- Patients and users of the NHS (including NHS patients treated in the private sector)¹¹
- Individuals identified as potential participants because of their status as relatives or carers of patients and users of the NHS
- Research involving adults in Scotland, Wales or England who lack the capacity to consent for themselves¹²
- A prison or a young offender institution in England and Wales (and is health related)¹⁴

- Clinical trial of a medicinal product or medical device¹⁵
- Access to data, organs or other bodily material of past and present NHS patients⁹
- Use of human tissue (including non-NHS sources) where the collection is not covered by a Human Tissue Authority licence⁹
- Foetal material and IVF involving NHS patients
- The recently deceased under NHS care
- None of the above

You must inform the Research Ethics Administrator of your NHS REC reference and approval date once approval has been obtained.

The HRA decision tool to help determine the type of approval required is available at <http://www.hra-decisiontools.org.uk/ethics>. If the University of Leeds is not the Lead Institution, or approval has been granted elsewhere (e.g. NHS) then you should contact the local Research Ethics Committee for guidance. The UoL Ethics Committee needs to be assured that any relevant local ethical issues have been addressed.

A.8 Will the participants be from any of the following groups? (Tick as appropriate)

- Children under 16¹⁶ **Specify age group:**

- Adults with learning disabilities¹²
- Adults with other forms of mental incapacity or mental illness
- Adults in emergency situations
- Prisoners or young offenders¹⁴
- Those who could be considered to have a particularly dependent relationship with the investigator, eg members of staff, students¹⁷

- Other vulnerable groups
- No participants from any of the above groups

Please justify the inclusion of the above groups, explaining why the research cannot be conducted on non-vulnerable groups.

It is the researcher's responsibility to check whether a DBS check (or equivalent) is required and to obtain one if it is needed. See also <http://ris.leeds.ac.uk/healthandsafetyadvice> and <http://www.homeoffice.gov.uk/agencies-public-bodies/dbs>.

A.9 Give a short summary of the research¹⁸

My research project is focussed on exploring interactions between humans and large carnivores (LC) in European landscapes. I will be looking at the dynamics between populations of LCs (wolf and brown bear), whose numbers are increasing, and managing authorities and rural communities in Asturias, Extremadura and Castille and León, Spain. The aim of the project is to explore pathways to resilient coexistence; the social and ecological factors that enable people and LCs to adapt to each other, and how these may be reinforced. I will adopt a case-study approach, drawing on perspectives and theories from both natural and social sciences, using mainly qualitative methods to gather and analyse data.

Specifically, the project will

- i. Explore the pathways (shaped by governance, social, environmental and economic conditions) that led to the current state of human-LC interactions in three types of rural communities:
 1. One that has had continuous presence of LCs
 2. One that is experiencing a return or drastic increase of LCs
 3. One that is expecting LCs to return in the near future.
- ii. Explore scenarios and aspirations for the future of human-LC interactions in these three communities, based on the perceptions of community members, current trends and uncertainties. The

emphasis is to understand how decisions today may impact the pathways leading to each of the futures derived.

The data collection will be based on three main research methods, which will work in tandem with each other: 1. An initial *ethnographic phase*, 2. *key informant interviews* in the communities and 3. public and one-on-one presentation of research findings of Phase I with key regional stakeholders through one-on-one and public presentations (open invitation) and a workshop arranged by the Spanish collaborator Entretantos. Upon the presentations, stakeholders will have the opportunity to comment on the research outputs, the new wolf policy and management plan (as of 2021) and express their aspirations for the future. The multi-method design, and the choice of research methods, was deemed to be central to the purpose of the empirical research.

A.10 What are the main ethical issues with the research and how will these be addressed?¹⁹

Positionality and language:

My gender, cultural background and my alliances with researchers related to the biodiversity conservation sector may influence data collection, the interpretative narrative as well as interviewee responses in various more or less predictable ways. I will address these issues by clearly describing the background and assumptions of the research when the data is collected and disseminated, ensuring the inclusion of a broad range of views among the research participants, emphasising active listening throughout and continuously seeking input on my framing and interpretations from my supervisors (who are not within the human-LC interactions research field).

While I am fluent in Spanish it is likely that certain local ways of expression will pass me by and that I at times might misunderstand my informants. This will be mitigated as far as possible by advising my informants about my language limitations before commencing the interviews. The interviews will be recorded which will enable me to re-listen and (if necessary) seek assistance from a native speaker to interpret what was said.

Sensitivity:

LC governance is a contentious topic and may involve references to illegal behaviour such as poaching and damage to property. It is sometimes a polarised issue in which managers or members of the public may risk negative social consequences if certain views are expressed openly. As the emphasis of the research is to explore solutions, I will not require or push my participants to elaborate about grievances or illegal activities, and I will clarify that they do not need to discuss topics they are uncomfortable with. Should sensitive data emerge under these premises I may end up using it, but in a way that does not include identifying details (pseudonymity), and will not share results between informants or project managers without prior consent. See further in section C.15.

The workshop is arranged by my Spanish Collaborator Entretantos. The workshops will be attended by key stakeholders upon invitation (myself included) but will also open up for public attendance (see enclosed invitation in Spanish). Since a sensitive topic will be discussed (wolf conservation), the workshop organisers will notify the participants of my presence and ask them for their consent for me to take notes during the workshop.

The presentations

Anonymity:

All participants will be advised that any information provided will be treated in strict confidence, that only information which they wish to share 'on the record' will be used in the research and that the raw data, including transcripts, will not be made available for any other persons or purposes. I will from the onset allocate a code to each participant related to their position in society, with an encrypted key stored electronically on my secure university server. Interview transcripts and audio files will be saved under the assigned codes. In some cases, references to positions, locations or occurrences may make the person's identity apparent. I will discuss this with the participants before interviews or focus groups are conducted, and omit mention of position of they so require. In general I will consider the data in aggregate to identify general themes rather than individual strands.

The main objective with the amended phase II is to present research findings from phase I and provide the participants with the opportunity to comment on the research and the new wolf policy (see amendment form). This means that workshop participants and stakeholders will not be required to express their views in front of others, in contrast to the original plan. I will let participants at the public presentations know that if they would like to express their views but would prefer to not to so in public, I will be available for one-on-one conversations and by email once the presentation is finished. Maintaining anonymity will thus not be an issue.

Informed consent

The option to participate in the study will be introduced to all potential participants through a written or verbal invitation (see appendix). Prior to their involvement in the research we will thoroughly discuss the consent form (which will be translated to Spanish) to ensure that they understand the conditions and nature of their involvement. The invitation, consent form and/or verbal inputs will explain the study, the research process, their right to withdraw and the anonymization protocol. This consent forms will be scanned and stored on a secure university network location. The originals will be shredded.

Managing expectations:

It is likely that some stakeholders are unhappy with the current governance of LCs. There is a risk that some may hope their participation in the research could contribute to changes, and thus it will be necessary to clearly state the potential outcomes of the research and its potential impacts at the outset. This information will be included as a part of the introduction and consent discussion, clarifying that individual participants may not benefit directly from the research, but that it may open up a longer term discussion about LCs, democracy, participation etc.

PART B: About the research team

B.1 To be completed by students only²⁰	
Qualification working towards (eg Masters, PhD)	PhD
Supervisor's name (Title, first name, surname)	Dr George Holmes
Department/ School/ Institute	Sustainability Research Institute
Faculty	School of Earth and Environment
Work address (including postcode)	Sustainability Research Institute School of Earth and Environment University of Leeds, Leeds LS2 9JT
Supervisor's telephone number	+44(0)113 343 1163
Supervisor's email address	g.holmes@leeds.ac.uk
Module name and number (if applicable)	

B.2 Other members of the research team (eg co-investigators, co-supervisors) ²¹	
Name (<i>Title, first name, surname</i>)	Dr Claire Quinn
Position	Co-supervisor
Department/ School/ Institute	Sustainability Research Institute

Faculty	School of Earth and Environment
Work address (<i>including postcode</i>)	Sustainability Research Institute School of Earth and Environment University of Leeds, Leeds LS2 9JT
Telephone number	+44(0)113 343 8700
Email address	c.h.quinn@leeds.ac.uk

Name (Title, first name, surname)	Dr Steven Sait
Position	Co-supervisor
Department/ School/ Institute	School of Biology
Faculty	Faculty of Biological sciences
Work address (including postcode)	School of Biology, Faculty of Biological Sciences University of Leeds, Leeds LS2 9JT
Telephone number	+44(0)113 343 7039
Email address	s.m.sait@leeds.ac.uk

Part C: The research

C.1 What are the aims of the study?²² (Must be in language comprehensible to a lay person.)

The aim of this project is to understand how coexistence capacity (the ability of humans and LCs to adapt to each other's presence and find ways to share landscapes) is determined by the surrounding **social-ecological systems (SES)**, how it evolves through **time** and to explore **pathways** to resilient coexistence.

Objectives:

- I. to describe processes, determinants and drivers of human and LC coexistence capacity within local systems, and to document the decision-making processes and social dynamics that influence the conditions that determines coexistence.
- II. to explore community aspirations and probable future scenarios of human-LC interactions and the associated landscapes within which they take place, including which governing and management strategies may result in the different scenarios.

C.2 Describe the design of the research. Qualitative methods as well as quantitative methods should be included.

Field research will comprise of two overlapping stages of data collection:

- I. a) Each case study will be initiated with a brief ethnographic stage to collect primary data. This phase will enable me to become familiar with local cultures and processes, and to produce situated types of knowledge. I will carry out basic **participant observation** at local meetings and events. Concurrently I will conduct an **iterative stakeholder analysis** in which initial brainstorming of relevant stakeholders will be complemented by asking informants to provide additional names and explain how they are related to the topic.

I will also include a **community mapping** element to generate local knowledge on where relevant activities (such as pastoral practices and wildlife tourism) are taking place, and how these overlap with current and potential carnivore habitats. Printed land cover base maps will be generated in ArcGIS prior to the field work, which will be used as visual support during interviews and focus groups. The maps will be elaborated with the informants by letting them sketch or indicate where their activities are taking place and where the maps diverge from their knowledge of the land, which subsequently will be incorporated and portrayed in GIS to support the analysis stage.

b) Identified themes will be expanded through **semi structured key informant interviews**. This will enable me to better capture complexities and answer the question 'why', which for this thesis is required to illuminate the framings, values and rationales that underpin past and present pathways, and how these framings are linked to socio-economic and socio-political structures. The interviews will conclude with a set of questions aimed to explore knowledge, views and aspirations about the desired future of the local community, to be used in phase III.

c) The first stage will conclude with the compiling of a **time line**, in which key events will be plotted and arranged in chronological order. It will combine observation and interview data with that gained from on-line research, e.g. project and government reports, newspaper articles and academic papers. The purpose is to visually document transitions and their driving forces over time and facilitate the analysis of causal links. It may be necessary to produce several versions in order to accommodate for disparate perceptions of the temporal order or significance of events.

- 1.
2. Feedback and validation meeting/presentation with a wider group of stakeholders.

C.3 What will participants be asked to do in the study?²³ (e.g. number of visits, time, travel required, interviews)

Depending on the aspect of research they are taking part in:

During stage I:

- to allow my presence during relevant meetings and events. This will be coordinated with relevant project managers. The participants will also be asked to answer questions when required and appropriate (in order to complete the stakeholder analysis and community mapping elements). These questions in the form of less formalised chats. Observations will be carried out with every effort made to not interfere in or delay work that participants may be engaged in.

- to take part in face-to-face interviews of 30 minutes to 1 hour, at secure/safe location which as far as possible is convenient to the informant. Some interviews may be conducted over skype. The language will be in English or Spanish depending on interviewee preference.

During stage II participants will be asked to express their views and provide oral and written input in focus groups, lasting approximately 3 hours.

C.4 Does the research involve an international collaborator or research conducted overseas?²⁴

Yes No

If yes, describe any ethical review procedures that you will need to comply with in that country:

I will collaborate with Spanish academics, based at Universidad de Oviedo and in Madrid, exchanging ideas, but not sharing data. No ethical review procedures are needed for my research in Spain.

Describe the measures you have taken to comply with these:

Include copies of any ethical approval letters/ certificates with your application.

C.5 Proposed study dates and duration

Research start date: 01-10-2019 Research end date: 01-10-2021(/2)

Fieldwork start date: 26-10-2019 (scoping trip) 01-02-2020 (field work).

Fieldwork end date: 09-10-2019 (scoping trip) 15-12-2020 (field work)

C.6. Where will the research be undertaken? ²⁵

Research and analysis will be undertaken at:

- University of Leeds premises
- University of Oviedo Premises, Spain
- Various public locations: coffee shops, public libraries and online

The fieldwork will be undertaken in the municipalities, national parks and agricultural facilities settled within the landscape Of Asturias/Cantabria and Castille and León. This could include:

- Farms
- Local council offices
- NGO offices
- Public meeting points such as parks, community halls and restaurants

Focus group workshops will be arranged at a communal meeting place that is easy to get to for the participants.

RECRUITMENT & CONSENT PROCESSES

C.7 How will potential participants in the study be identified, approached and recruited?²⁶

Locating the final case study sites within the selected region and recruiting participants will initially be dependent on on-line information and insights from the Spanish academics with whom I am collaborating. They have been conducting research in the area for a number of years and are familiar with ongoing projects and developments of human-LC interactions in the country.

In order to better understand and delineate the local context of the sites and begin the stakeholder mapping process I will conduct a scoping trip during the autumn/winter (included in this application). A snowball sampling strategy will be used in order to grow the stakeholder network and include as many views as possible. The stakeholder groups will likely involve farmers, hunters, ecotourism entrepreneurs, government officials, nature conservation NGO staff etc. In some cases a stakeholder may belong to several of these groups at the same time, which will be taken into account in the proceeding analysis.

Informants and focus group participants will be recruited among those considered relevant following the stakeholder mapping process. Some of the informants will be approached in person during mutual events, while some will be contacted over e-mail or telephone depending on what is deemed appropriate according to social codes. The sample included in the study is not intended to be representative of the whole population (village/community/region) and the results will not claim to be generalisable in this way.

C.8 Will you be excluding any groups of people, and if so what is the rationale for that?²⁷

I will attempt to, within the scope of the study, involve representatives or views from all local groups relevant to human-LC interactions at each of the sites in question.

C.9 How many participants will be recruited and how was the number decided upon?²⁸

The interviews in each of the three locations will continue until a saturation point is reached, wherein few new perspectives or insights are gained by additional interviews. Depending on the comprehensiveness of the preceding ethnographic phase and the size of the community, an estimated 15-35 interviews or less formalised conversations per case study will be needed to represent views from relevant stakeholder groups. This figure was derived from earlier studies, from which the number of stakeholder groups typically available in a Spanish rural community was estimated. I aim to interview 1-3 stakeholders from each stakeholder group. Data from interviews will be contextualized with data from the observation stage and online resources in order to provide further depth and breadth to the findings, compensating the relatively low number of interviewees.

The focus groups will, according to recommendations from academic literature on this method, aim for group sizes of 6-12 individuals in order to maximise participants' ability to contribute and to avoid break-out groups. Depending on participants' mobility and time constraints it is estimated that 1-3 focus groups will be required in order to capture the diversity of possible pathways and future scenarios.

C10 Will the research involve any element of deception?²⁹

If yes, please describe why this is necessary and whether participants will be informed at the end of the study.

No

C.11 Will informed consent be obtained from the research participants?³⁰

Yes No

If yes, give details of how it will be done. Give details of any particular steps to provide information (in addition to a written information sheet) e.g. videos, interactive material. If you are not going to be obtaining informed consent you will need to justify this.

Informed consent will be obtained from participants for the interviews and participation in the focus groups. When approaching participants I will be transparent about the background and objectives of the study and clarify that their contribution is voluntary.

It will not always be possible to obtain informed consent for observation during meetings and events, but I will ensure that participants are informed of my presence and of the study that I am conducting, including how the data will be handled. This will be done by communicating with the main organiser before the event/meeting takes place. I will ask them to announce my presence and give the participants a chance to object if they do not want their opinions to be recorded. Where the environment allows for consent to be obtained without undue intrusion, every effort will be made to do so. If the organisers agree to this I will take some time at the beginning of the event to distribute and discuss the consent forms.

During the recruitment process for the interview and focus group participants will be provided with an 'invitation' which will outline the

purpose of the research, the role of the participant within it and the rationale for their inclusion (see appendix).

Before interviews and focus groups are commenced the interviewees will be provided with a copy of the invitation and a consent form to sign. In some cases it may be more appropriate to provide the explanation and gain consent orally, which will be recorded in the beginning of the interview. Any issues will be discussed and clarified before the interview commences.

I will ensure that the focus group participants have time to consider the information prior to assembling in the groups, in order to give them the chance to ask questions or address any issues without the presence of the group.

If participants are to be recruited from any of potentially vulnerable groups, give details of extra steps taken to assure their protection. Describe any arrangements to be made for obtaining consent from a legal representative.

Will research participants be provided with a copy of the Privacy Notice for Research? If not, explain why not. Guidance is available at <https://dataprotection.leeds.ac.uk/information-for-researchers>.

Yes No

Copies of any written consent form, written information and all other explanatory material should accompany this application. The information sheet should make explicit that participants can withdraw from the research at any time, if the research design permits. Remember to use meaningful file names and version control to make it easier to keep track of your documents.

Sample information sheets and consent forms are available from the University ethical review webpage at <http://ris.leeds.ac.uk/InvolvingResearchParticipants>.

C.12 Describe whether participants will be able to withdraw from the study, and up to what point (eg if data is to be anonymised). If withdrawal is not possible, explain why not.

I will be clear when recruiting participants that their contributions is voluntary and that they can choose to withdraw their participation at any point during the interviews and focus groups. I will also clarify that they have the option to refrain from answering questions if they so wish. Participants will have either until the submission of a paper, or two months after fieldwork has concluded to withdraw. This information will be detailed in the email/discussion in which the interview is arranged. The participants will be advised that after this point they would no longer be able to withdraw their data, but that publication would preserve anonymity and not enable them to be identified.

C.13 How long will the participant have to decide whether to take part in the research?³¹

When potential informants are approached (on the spot, such as during a public meeting, or by phone or email) they will be given the option to consider their participation in the research. Normally up to a week, but in some circumstances, such as if someone is time-pressed or the issue is urgent, it may be necessary to conduct the interview straight away. I will in these cases still offer the participant a moment in private to consider my request. When contact is re-established to confirm their participation they will once again be informed about the study and their role in it.

C.14 What arrangements have been made for participants who might have difficulties understanding verbal explanations or written information, or who have particular communication needs that should be taken into account to facilitate their involvement in the research?³²

It is outside of the capacity and scope of the study to include participants with particular communication needs outside of written or oral.

C.15 Will individual or group interviews/ questionnaires discuss any topics or issues that might be sensitive, embarrassing or upsetting, or is it possible that criminal or other disclosures requiring action could take place during the study (e.g. during interviews or group discussions)?³³ *The information sheet should explain under what circumstances action may be taken.*

Yes No *If yes, give details of procedures in place to deal with these issues.*

As outlined above it is often the case that elements of LC governance are contentious. Polarisation may occur between advocates of LC conservation and those who wishes LCs eradicated, and between proponents of different forms of LC management. The sensitive topics discussed may include opinions relating to management, information relating to criminal offences and illegal behaviour such as poaching and damage to property.

While the purpose of the research is not to delve deeper into conflict or illegal activities, they are a relevant components of tracing how human-LC interactions have changed over time. However, the scope of the study only require information about such components at a general level, which can be gained through interviews with local researchers, media and on-line sources. I will thus not require participants to elaborate about the disagreements they may have with other stakeholders or about whether they have engaged in illegal activities themselves.

I will clarify the solution-focus to the participants, and thus that topics outside of this scope will not be pursued unless they bring them up themselves. I will advise participants that they should not feel obliged to disclose anything that makes them uncomfortable. I will moreover ensure anonymity for all participants and will not share results between informants or project managers without prior consent.

I will consult with my local collaborators to ensure I understand the local context and sensitive areas as well as possible, and adapt my research questions accordingly. I will closely monitoring the groups, and potentially conclude the workshop if things get too contested or heated.

C.16 Will individual research participants receive any payments, fees, reimbursement of expenses or any other incentives or benefits for taking part in this research?³⁴

Yes No

If Yes, please describe the amount, number and size of incentives and on what basis this was decided.

It may be relevant to offer refreshments and meals to interviewees. Refreshments and a light meal will be offered during the focus groups, and I will offer to reimburse focus group participants for travel costs related to getting to the selected venue.

RISKS OF THE STUDY

C.17 What are the potential benefits and/ or risks for research participants in both the short and medium-term?³⁵

The research is not expected to place participants in direct risk of any physical or mental hazards and will not be asking the participants to

disclose any distressing information. Nor is it expected to deliver direct benefits to them, other than an opportunity to share their views on the topic.

Indirectly the research may contribute to increasing awareness and reflection of issues faced by rural communities (which are impeding their ability to adapt to LCs) and of place-based approaches to decrease vulnerability to social, economic, ecological and political processes. It could also contribute to providing a platform for exploring solutions and finding common interests among stakeholder groups and with local or regional governments.

C.18 Does the research involve any risks to the researchers themselves, or people not directly involved in the research? *Eg lone working*³⁶

Yes No

If yes, please describe: The field-work will involve lone working and travelling in Spain, with associated risks generated by being in a less familiar social and cultural setting. However, I have previous experience of living and working in Spain. I also have experience in doing research in Spanish-speaking countries (Argentina), where I collected similar types of data on a contentious conservation project.

The risks will be mitigated by consulting with my Spanish collaborators about the safety of different modes of travel, sites and engagement with different stakeholder groups. If sites that are deemed less safe requires a visit I will ensure to go accompanied by an assistant or one of my collaborators.

Is a risk assessment necessary for this research?

If you are unsure whether a risk assessment is required visit <http://ris.leeds.ac.uk/HealthAndSafetyAdvice> or contact your Faculty Health and Safety Manager for advice.

Yes No If yes, please include a copy of your risk assessment form with your application.

RESEARCH DATA

C.19 Explain what measures will be put in place to protect personal data. E.g. anonymisation procedures, secure storage and coding of data. Any potential for re-identification should be made clear to participants in advance.³⁷ *Please note that research data which appears in reports or other publications is not confidential, even if it is fully anonymised. For a fuller explanation see <http://ris.leeds.ac.uk/ConfidentialityAnonymisation>. Further guidance is available at <http://ris.leeds.ac.uk/ResearchDataManagement>.*

Data will be recorded through digital audio recordings and in handwritten notes in a field diary. These will be transferred daily to my electronic database on a password-protected university laptop. I will keep this laptop with me or in a locked cabinet or safe. Instead of using names I will allocate a code to each participant related to their position in society. In some cases references to positions, locations or occurrences may make the person's identity apparent. In that case participants will be asked whether their role can be named in the research and I will discuss with them how they would prefer to be identified. After having assigned participants codes they will not be re-identified. The document with the keys and codes will be encrypted and stored electronically.

In order to handle and store the data safely I will take an OD&PL course in data safeguarding and get IT support on encryption strategies. Research data will be stored electronically on a password protected university laptop on my M drive in accordance with the UoL data protection policy. All

interview and focus group transcripts (after names removed and codes assigned) will also be stored on the system or in locked cabinets in case of written documents.

For interviews, this information will take the form of electronic recordings, researcher notes, interviews transcribed into Word, and the Nvivo files associated with data analysis. Signed consent forms will be scanned and stored on the secure University of Leeds M drive. The paper copies will be shredded.

Focus group data will comprise of audio recordings, post-it notes, sheets of papers, maps and photos that will be scanned, stored and deleted as above.

Electronic data will be retained for two years after publication or three years after the end of data collection, whichever is longer.

C.20 How will you make your research data available to others in line with: the University's, funding bodies' and publishers' policies on making the results of publically funded research publically available. Explain the extent to which anonymity will be maintained. (max 200 words) Refer to <http://ris.leeds.ac.uk/ConfidentialityAnonymisation> and <http://ris.leeds.ac.uk/ResearchDataManagement> for guidance.

The data provided by observation and interviews will be personal data which could be used to identify my informants. Given that LC governance is a contentious topic this data may be sensitive, in particular if there is information relating to illegal behaviours or views that are considered provocative to other groups. Moreover, the data will be collected in Spanish and the analysis inherently dependent on the context within which it is collected. Thus, while the results of the research will be made available through publications, I do not plan to make raw data from interviews and focus groups available to others.

C.21 Will the research involve any of the following activities at any stage (including identification of potential research participants)?

(Tick as appropriate)

- Examination of personal records by those who would not normally have access
- Access to research data on individuals by people from outside the research team
- Electronic surveys, please specify survey tool:
_____ (further guidance)
- Other electronic transfer of data
- Use of personal addresses, postcodes, faxes, e-mails or telephone numbers
- Use of audio/ visual recording devices (NB this should usually be mentioned in the information for participants)
- FLASH memory or other portable storage devices

Storage of personal data on, or including, any of the following:

- University approved cloud computing services
- Other cloud computing services
- Manual files
- Private company computers
- Laptop computers
- Home or other personal computers (not recommended; data should be stored on a University of Leeds server such as your M: or N: drive where it is secure and backed up regularly: <http://ris.leeds.ac.uk/ResearchDataManagement>.)

Unclassified and Confidential University data must be kept on the University servers or in approved cloud services such as Office 365 (SharePoint or OneDrive). The N: Drive or Office 365 should be used for the storage of data that needs to be shared. If Highly Confidential

information is kept in these shared storage areas it must be encrypted. Highly Confidential data that is not to be shared should be kept on the M: Drive. The use of non-University approved cloud services for the storage of any University data, including that which is unclassified, is forbidden without formal approval from IT. Further guidance is available via <http://ris.leeds.ac.uk/ResearchDataManagement>.

C.22 How do you intend to share the research data? (Indicate with an 'X) Refer to <http://library.leeds.ac.uk/research-data-deposit> for guidance.

- Exporting data outside the European Union
- Sharing data with other organisations
- Publication of direct quotations from respondents
- Publication of data that might allow identification of individuals to identified
- Submitting to a journal to support a publication
- Depositing in a self-archiving system or an institutional repository
- Dissemination via a project or institutional website
- Informal peer-to-peer exchange
- Depositing in a specialist data centre or archive
- Other, please state:
_____.
- No plans to report or disseminate the data

C.23 How do you intend to report and disseminate the results of the study? (Indicate with an 'X) Refer to <http://ris.leeds.ac.uk/ResearchDissemination> and <http://ris.leeds.ac.uk/Publication> for guidance.

- Conference presentation
- Peer reviewed journals
- Publication as an eThesis in the Institutional repository
- Publication on website
- Other publication or report, please state:

- Submission to regulatory authorities
- Other, please state:
_____.
- No plans to report or disseminate the results

C.24 For how long will data from the study be stored? Please explain why this length of time has been chosen.³⁸ Refer to the [RCUK Common Principles on Data Policy](http://ris.leeds.ac.uk/info/71/good_research_practice/106/research_data_guidance/5) and http://ris.leeds.ac.uk/info/71/good_research_practice/106/research_data_guidance/5.

Students: *It would be reasonable to retain data for at least 2 years after publication or three years after the end of data collection, whichever is longer.*

2 years, _____ months

CONFLICTS OF INTEREST

C.25 Will any of the researchers or their institutions receive any other benefits or incentives for taking part in this research over and above normal salary or the costs of undertaking the research?³⁹

- Yes No

If yes, indicate how much and on what basis this has been decided

C.26 Is there scope for any other conflict of interest?⁴⁰ *For example, could the research findings affect the any ongoing relationship between any of the individuals or organisations involved and the researcher(s)? Will the research funder have control of publication of research findings? Refer to <http://ris.leeds.ac.uk/ConflictsOfInterest>.*

Yes No

If so, please describe this potential conflict of interest, and outline what measures will be taken to address any ethical issues that might arise from the research.

C.27 Does the research involve external funding? (Tick as appropriate)

Yes No ***If yes, what is the source of this funding?***

NB: If this research will be financially supported by the US Department of Health and Human Services or any of its divisions, agencies or programmes please ensure the additional funder requirements are complied with. Further guidance is available at <http://ris.leeds.ac.uk/FWAcompliance> and you may also contact your FRIO for advice.

PART D: Declarations


Declaration by Principal Investigators

1. The information in this form is accurate to the best of my knowledge and belief and I take full responsibility for it.
2. I undertake to abide by the University's ethical and health & safety guidelines, and the ethical principles underlying good practice guidelines appropriate to my discipline.
3. If the research is approved I undertake to adhere to the study protocol, the terms of this application and any conditions set out by the Research Ethics Committee (REC).
4. I undertake to seek an ethical opinion from the REC before implementing substantial amendments to the protocol.
5. I undertake to submit progress reports if required.
6. I am aware of my responsibility to be up to date and comply with the requirements of the law and relevant guidelines relating to security and confidentiality of patient or other personal data, including the need to register when necessary with the University's Data Protection Controller (further information available via <http://ris.leeds.ac.uk/ResearchDataManagement>).
7. I understand that research records/ data may be subject to inspection for audit purposes if required in future.
8. I understand that personal data about me as a researcher in this application will be held by the relevant RECs and that this will be managed according to the principles established in the Data Protection Act.
9. I understand that the REC may choose to audit this project at any point after approval.

Sharing information for training purposes: *Optional – please tick as appropriate:*

- I would be content for members of other Research Ethics Committees to have access to the information in the application in confidence for training purposes. All personal identifiers and references to researchers, funders and research units would be removed.

Principal Investigator:

Signature of Principal Investigator: 

(This needs to be an actual signature rather than just typed. Electronic signatures are acceptable)

Print name: Hanna Pettersson..... Date: (dd/mm/yyyy):
..2019-09-02.....

Supervisor of student research:

I have read, edited and agree with the form above.

Supervisor's signature: 

(This needs to be an actual signature rather than just typed. Electronic signatures are acceptable)

Print name:George Holmes Date: (dd/mm/yyyy):
.....2/09/2019.....

Please submit your form by email to the FREC or School REC's mailbox.

Remember to include any supporting material such as your participant information sheet, consent form, interview questions and recruitment material with your application.

To help speed up the review of your application:

- Answer the questions in plain English, avoid using overly technical terms and acronyms not in common use.
- Answer all the questions on the form, including those with several parts (refer to the guidance if you're not sure how to answer a question or how much detail is required).
- Include any relevant supplementary materials such as
 - Recruitment material (posters, emails etc)
 - Sample participant information sheet
 - Sample consent form. Include different versions for different groups of participants eg for children and adults, clearly indicating which is which.
 - Signed risk assessment (If you are unsure whether a risk assessment is required visit <http://ris.leeds.ac.uk/HealthAndSafetyAdvice> or contact your Faculty Health and Safety Manager for advice).

Remember to include use version control and meaningful file names for the documents.

- If you are not going to be using participant information sheets or consent forms explain why not and how informed consent will be otherwise obtained.
- If you are a student it is essential that you discuss your application with your supervisor.
- Submit a signed copy of the application, preferably electronically. Students' applications need to be signed by their supervisors as well

The Secretariat
University of Leeds
Leeds, LS2 9JT
Tel: 0113 343 4873

Email: ResearchEthics@leeds.ac.uk



UNIVERSITY OF LEEDS

Dear Hanna

AREA 19-018 Amd Oct 2021 - The Future of Human Carnivore Conflict and Coexistence in Europe

NB: All approvals/comments are subject to compliance with current University of Leeds and UK Government advice regarding the Covid-19 pandemic.

I am pleased to inform you that the above research ethics application has been reviewed by the School of Business, Environment and Social Services (AREA) Committee and on behalf of the Chair, I can confirm a favourable ethical opinion based on the documentation received at date of this email.

Please retain this email as evidence of approval in your study file.

Please notify the committee if you intend to make any amendments to the original research as submitted and approved to date. This includes recruitment methodology; all changes must receive ethical approval prior to implementation. Please see <https://ris.leeds.ac.uk/research-ethics-and-integrity/applying-for-an-amendment/> or contact the Research Ethics Administrator for further information researchethics@leeds.ac.uk if required.

Ethics approval does not infer you have the right of access to any member of staff or student or documents and the premises of the University of Leeds. Nor does it imply any right of access to the premises of any other organisation, including clinical areas. The committee takes no responsibility for you gaining access to staff, students and/or premises prior to, during or following your research activities.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, risk assessments and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited.

It is our policy to remind everyone that it is your responsibility to comply with Health and Safety, Data Protection and any other legal and/or professional guidelines there may be.

I hope the study goes well.

Best wishes

Georgina Hough

On behalf of Dr Matthew Davis, CHAIR, AREA

The Secretariat
University of Leeds
Leeds, LS2 9JT
Tel: 0113 343 4873

Email: ResearchEthics@leeds.ac.uk



UNIVERSITY OF LEEDS

Hanna Pettersson
School of Earth and Environment
University of Leeds
Leeds, LS2 9JT

**Business, Environment and Social Sciences joint Faculty Research
Ethics Committee (AREA FREC)**

22 May 2020

Dear Hanna

Title of study: **The Future of Human Carnivore Conflict and
Coexistence in Europe**

Ethics reference: **AREA 19-018**

I am pleased to inform you that the above research application has been reviewed by the Social Sciences, Environment and LUBS (AREA) Faculty Research Ethics Committee and following receipt of your response to the Committee's initial comments, I can confirm a favourable ethical opinion as of the date of this letter. The following documentation was considered:

Document	Version	Date
AREA 19-018 Pettersson_Ethical_Review_Form_V3_ .doc	2	03/09/19
AREA 19-018 Email Invitation_focus group.docx	1	19/09/19
AREA 19-018 Email_Invitation_Interview	1	19/09/19
AREA 19-018 Information sheet_focus groups.docx	1	19/09/19

AREA 19-018 Information sheet_interview.docx	1	19/09/19
AREA 19-018 Pettersson_Information sheet_GH.docx	1	03/09/19
AREA 19-018 Pettersson_participant_consent_form_Focus Groups.doc	1	19/09/19
AREA 19-018 Pettersson_participant_consent_form_Interviews.docx	1	19/09/19
AREA 19-018 Pettersson_participant_consent_form_GH.doc	1	03/09/19
AREA 19-018 Pettersson_Fieldwork_Assessment_Form_medium_risk.doc	1	19/09/19

Please notify the committee if you intend to make any amendments to the information in your ethics application as submitted at date of this approval as all changes must receive ethical approval prior to implementation. The amendment form is available at <http://ris.leeds.ac.uk/EthicsAmendment>.

Please note: You are expected to keep a record of all your approved documentation and other documents relating to the study, including any risk assessments. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited. There is a checklist listing examples of documents to be kept which is available at <http://ris.leeds.ac.uk/EthicsAudits>.

We welcome feedback on your experience of the ethical review process and suggestions for improvement. Please email any comments to ResearchEthics@leeds.ac.uk.

Yours sincerely

Jennifer Blaikie

Senior Research Ethics Administrator, the Secretariat

On behalf of Dr Matthew Davis, Chair, [AREA Faculty Research Ethics Committee](#)

CC: Student's supervisor(s)

Appendix C
Participant information sheet

Information sheet

Name of Project: The Future of Human-Large Carnivore Coexistence in Europe

Lead Researcher: Hanna Petterson, University of Leeds, United Kingdom

You or your organisation is hereby invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of this research?

This is a PhD research project, which is supported by the University of Leeds in the United Kingdom. It will provide an in-depth study of the present and future interactions between returning or increasing bear and wolf populations, the local communities who are impacted and the authorities who manage wildlife. The study aims to explore how rural landscapes in Spain are changing (socially, ecologically and economically) and how these changes affects the ability of local people to live alongside large carnivores, as well as the carnivores ability to adapt to/avoid human activities. By looking at key trends and uncertainties of how the social and ecological landscape will develop in the future, the study will discuss with local stakeholders how to increase local villages ability to deal with these changes.

Why is this research needed?

The research will generate much needed information about which social, ecological and economic conditions that can enhance people's and large carnivore's ability to exist in the same landscape with minimal negative impact on each other.

Who will be involved in the research and where will the research take place?

The research will be undertaken at the provincial and local level in Asturias, Galicia and Castilla y León. It will involve spending time in several municipalities, national parks and rural areas where human activities and carnivores coincide. Participants in the research will include local residents, business owners, farmers, hunters, local and regional government officials, people from conservation organisations and researchers.

How will the research be carried out?

Information will be collected by observations during meetings and events, by interviews with impacted stakeholders and focus group discussions. The interviews will, if you give your consent, be audio recorded. Once the recording has been transcribed, the audio-recording will be destroyed.

Are there any risks I should be aware of?

The project may involve some professional and emotional risks from risks from discussing your views on a potentially sensitive topic with the researcher. For this reason, care will be taken to protect your identity by keeping all responses anonymous and only including information you are comfortable to share in the research. If you require I will also exclude information related to your professional position or your area of residence, in case it could make your identity apparent to the public. All research data, including audio-recordings and any notes will password protected and will not be shared with anyone outside the research project.

What will the research produce?

The study will produce an academic thesis and publications that will be submitted to academic journals. The findings of the focus groups (in which future scenarios of the local landscape will be explored) will be presented to and discussed with at a meeting with interested participants in the local villages. Briefing papers will be produced to disseminate the research findings and encourage their use amongst local and wider stakeholders engaged in the management of human-large carnivore interactions.

If I have concerns or complaints?

The ethics protocol for this project was reviewed by the University of Leeds Research Ethics Board, which provided clearance to carry out the research

If you have any ethical concerns or issues with the study, please contact the project supervisor, Dr. George Holmes (Email: G.Holmes@leeds.ac.u)

Appendix D Consent form

Consent to take part in a study about Human-Large Carnivore Interactions in Spain

Research team at the University of Leeds:

Hanna Pettersson

Dr George Holmes

Dr Claire Quinn

Dr Steve Sait

Add your
initials next to
the statement
if you agree

I confirm that I have read and understand the information sheet/ letter dated [insert date] explaining the above research project and I have had the opportunity to ask questions about the project.

I understand that my participation is voluntary and that I am free to withdraw at any time during the interview or the focus group without giving any reason and without there being any negative consequences.

It is possible to withdraw your contribution up until the data has been written up and published, or up until 2 months after field work has ended [insert suggested date].

If you wish to withdraw please contact Hanna Pettersson: +447491121171, eehlp@leeds.ac.uk.

Data that is withdrawn will be shredded (if recorded on paper) or deleted (if stored electronically).

I understand that I am free to decline if I do not wish to answer any particular question or questions, and that I am under no obligation to disclose any information that I find uncomfortable or sensitive. I understand that sensitive information that I do share may be used in anonymised form in the outputs of the research project.

I understand that the focus groups will consist of different types of stakeholders from my community or region, and that

anonymity (outside of the research and data collection) is contingent on group members adhering to protocols agreed upon by the group. I agree to respect other participants' privacy and not disclose information that may be sensitive outside of the workshop.	
I give permission to the lead researcher to audio record the focus group. The recording will be deleted once it has been transcribed, transcriptions will be password protected.	
I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, but that contextual information such as my approximate location and the sector in which I work may be included. I understand that the research team will try to ensure that I cannot be identified using these details, but that I can chose to exclude this information if I so wish.	
I agree for the data collected from me to be stored and used in relevant future research, in an anonymised form, by the research team.	
I agree to take part in the above research project.	

Name of participant	
Participant's signature	
Date	
Name of lead researcher	
Signature	
Date*	

*To be signed and dated in the presence of the participant.

Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, the letter/ pre-written script/ information sheet and any other written information provided to the participants. A copy of the signed and dated consent form should be kept with the project's main documents which must be kept in a secure location

Appendix E

Interview protocol*

**Example structure. Will be adapted according to wolf state and stakeholder type.*

Introduction

- Personal presentation
- Research presentation:
“This research is looking at sustainable development, adaptation and the conservation of cultural and biological diversity in rural areas. ”.
- Confirm interviewee has read information sheet.
- Any questions?
- Remind interviewee they can interrupt at any time or skip questions.
- Oral/written consent
- Confirm consent to record

Theme 1: the present

- How long have you been living here? (how many generations?)
- How is life in this community?
- What makes this area a good place to live in?
- Are there any challenges or problems?
- What factors have the biggest impact on your life/livelihood today?
- Do you feel that you have a say on how these factors are governed/managed?
- Who does?

Theme 2: The past

- How was life in this place in the past/how has it changed within your lifetime/that of your family?
- Has the surrounding nature/landscape changed?
- What caused these changes?
- How did you/the community adapt?

Theme 3: The future

- How do you think life (in this village/region/location) will change over the next few decades?
- Where do you see yourself/your village/the life of your children in 25 years?

- Which are the biggest transitions at play/changes in process today?
 - How do you feel about these transitions?
 - Do you feel that you/ the community is able to adapt to these transitions?
 - How/why not?
 - What factors would make it easier for you to manage these changes or transitions?
 - Who is responsible to facilitate these factors?
- what would you like the future to be like, if you could dream freely.
- what could/should be done today to achieve such a future?

Theme 4: Carnivores (if they haven't been brought up by the informant previously)

- How do you interact with surrounding nature and wildlife?/ Is it common to encounter wildlife here? What types?
 - Are there wolves in this area?
 - Do they have an impact on your life?
 - How?
 - What are the negative and/or positive aspects of having wolves in the region where you live?
 - How have you adapted to their presence?
 - Do you think it is possible for humans and carnivores to share the same landscape?
 - if yes, what are the prerequisites for this?
 - if no: in which scenario would coexistence be possible? /what would it take?
 - how do you think they large carnivores should be managed, and by whom?
 - What would be a just way to structure management (so that everyone's interest is represented)?
- Do you think the attitude towards carnivores in society in general have changed/is changing? How and why?
- What do you think the relationship between humans and carnivores will look like in the future, given current trends (depopulation, climate change, laws, tourism etc)?
- What place do wolves have in your ideal future discussed previously?

Conclusion

- **What would you want to know/want me to investigate/feed back to you/this community? How?**
- Is there anything you would like to add or that I you think I should have asked you?
- Is there anything you would like to ask me?
- How do you want to be identified?
- Thank you!

Appendix F
Poster: Invitation to dissemination

EL FUTURO DE HUMANOS, PAISAJES TRADICIONALES Y LOBOS EN ESPAÑA



PRESENTACIÓN ABIERTA DE
HANNA PETTERSSON,
SUSTAINABILITY RESEARCH INSTITUTE



UNIVERSITY OF LEEDS

Appendix G

Media engagement and public dissemination.

Table G.1. Outreach, input and engagement informing/informed by the thesis.

	Date	Title	Source	Media	Type	Country	URL
Pre-fieldwork	22-26/08/2019	Pathways 2019: Human Dimensions of Wildlife Conference - Presented initial framework for resilient coexistence	Colorado State University		Oral presentation	USA	
		The Craft of Qualitative Longitudinal Research	SAGE	Book	Project mention	UK	
Fieldwork	19/07/2020	Desde Suecia hasta Picos para conocer a lobos y pastores	El Comercio	Newspaper	Interview	Spain	https://www.elcomercio.es/asturias/heroes-del-campo/suecia-picos-conocer-20200719000535-ntvo.html?ref=https%3A%2F%2Fwww.google.com%2F
	19/07/2020	Suecia estudia el problema del lobo	La Nueva España	Newspaper	Interview	Spain	https://www.lne.es/oriente/2020/07/19/suecia-estudia-problema-lobo-14448887.html
	19/07/2020	Interview with Hanna Pettersson about her work	El Pregón de la Garganta	Local magazine	Interview	Spain	
	06/08/2020	Presentation about research for the INLAND shepherd school, Asturias			Oral presentation	Spain	
	20/10/2020	Presentation about research to school kids at Garganta La Olla, Cáceres			Oral presentation	Spain	

	03/12/2020	'Loved and feared : Spain ' s complicated relationship with wolves'	El País	Newspaper	Interview	UK	https://english.elpais.com/society/2020-12-03/loved-and-feared-spains-complicated-relationship-with-wolves.html .
	24/12/2020	Friend or foe? Europe's largest wolf population divides opinion in Spain and Portugal	The Independent	Newspaper	Mention (ref El País paper)	UK	https://www.independent.co.uk/news/world/europe/wolf-spain-portugal-conservation-hunt-b1778635.html
Post-fieldwork	10/09/2021	Learning from those who live with wolves	University of Leeds	University News	Press release		https://www.leeds.ac.uk/news-society-politics/news/article/4907/learning-from-those-who-live-with-wolves
	10/09/2021	Un estudio concluye que la convivencia entre lobos y ganaderos es posible	Radiotelevisión del Principado de Asturias	Regional TV	Skype interview	Spain	https://www.rtpa.es/noticias-ciencia:-Un-estudio-concluye-que-la-convivencia-entre-lobos-y-ganaderos-es-posible-_111631271606.html
	16/09/2021	Spain Divided Over Prohibiting Wolf Hunts	Zenger	Newspaper	Interview	USA	https://www.zenger.news/2021/09/16/spain-divided-over-prohibiting-wolf-hunts/
	22/09/2021	La convivencia entre humanos y lobos es posible si las comunidades rurales reciben un mayor apoyo	University of Oviedo	University News	Press release	Spain	https://www.uniovi.es/en/-/convivencia-lobo-humanos
	29/09/2021	Quand les bergers sont aidés, le loup est accepté	Reporterre	Newspaper	Email interview	France	https://reporterre.net/Quand-les-bergers-sont-aides-le-loup-est-accepte
	30/09/2021	Hanna Pettersson pide una reflexión mayor y a largo plazo sobre el lobo	Radiotelevisión del Principado de Asturias	Regional TV	Skype interview		https://www.rtpa.es/noticias-asturias:Hanna-Pettersson-pide-una-reflexion-mayor-y-a-largo-plazo-sobre-el-lobo_111632996099.html

	29/09/2021 AND 04/10/2021		RTVE	National radio	Skype interview	Spain	https://www.rtve.es/play/audios/por-tres-razones/
	11/09/2021	La coexistencia del lobo y la ganadería como objeto de análisis en Villardeciervos	Benaventedigital .es		Disseminatio n trip coverage	Spain	https://www.benaventedigital.es/la-coexistencia-del-lobo-y-la-ganaderia-como-objeto-de-analisis-en-villardecervos/
Research Dissemina tion at study sites	6- 7/11/2021	Workshop in Sanabria with members of Observatorio Campo Grande.			Oral Presentation	Spain	
	9/11/2021	Public presentation + question time in Sanabria, facilitated by the local council.			Oral Presentation	Spain	
	14/11/2021	Public presentation + question time in Jarandilla, hosted by the university, facilitated by Entretantos and the local council.			Oral Presentation	Spain	
	17/11/2021	Public presentation + question time in Onís, facilitated by the local council.			Oral Presentation	Spain	
Post- disseminat ion	15/11/2021	How to live with large predators – lessons from Spanish wolf country	The Conversation	Science Magazine	Authored	UK	https://theconversation.com/how-to-live-with-large-predators-lessons-from-spanish-wolf-country-167326
	15/11/2021	Cómo convivir con grandes depredadores: Lecciones desde zonas rurales de España habitadas por lobos	The Conversation	Science Magazine	Authored	UK/Spai n	https://theconversation.com/como-convivir-con-grandes-depredadores-lecciones-desde-zonas-rurales-de-espana-habitadas-por-lobos-171057
	18/11/2022	«Hay futuro para los pastores y los lobos, en el mismo sitio o no», afirma Hanna Pettersson	El Comercio	Regional newspaper	Disseminatio n trip coverage	Spain	https://www.elcomercio.es/asturias/heroes-del-campo/futuro-pastores-lobos-2021118000609-ntvo.html
	18/11/2021	Asturias tiene el 12% de las manadas de lobos que hay en España, concluye un estudio	La Nueva España	Regional newspaper	Disseminatio n trip coverage	Spain	https://www.lne.es/oriente/2021/11/18/asturias-12-manadas-lobos-hay-59654420.html

17/12/2021	Mi estudio sobre el futuro de lobos y ganadería extensiva en España: Resultados, Observaciones y Reflexiones	El Pregón de Garganta	Local magazine	Authored	Spain	http://elpregon.es/37-diciembre-2021
12-15/12/2021	Ecology across borders Conference	British Ecological Society		Oral presentation	UK	
24/12/2021	Mi estudio sobre el futuro de lobos y ganadería extensiva en España: Resultados, Observaciones y Reflexiones	El Pregón de Jarandilla	Local magazine	Authored	Spain	
11/01/2022	Un futuro compartido de lobos y ganadería extensiva en España: ¿dónde y cómo?	Grupo Campo Grande web	Web publication	Authored	Spain	http://www.grupocampogrande.org/un-futuro-compartido-de-lobos-y-ganaderia-extensiva-en-espana-donde-y-como/
19/02/2022	Hanna Pettersson - Wolves Social Impact Across Europe	The Wolf Connection	Podcast	Interview	USA	https://thewolfconnection.buzzsprout.com/1081496/10089471-episode-65-hanna-pettersson-wolves-social-impact-across-europe
22/02/2022	Wolves are returning to European farmland – but they're not motivated by a taste for sheep	The Conversation	Science Magazine	Co-authored	UK	https://theconversation.com/wolves-are-returning-to-european-farmland-but-theyre-not-motivated-by-a-taste-for-sheep-175445
30/09/2022	Interview about paper 2	The CONVIVA podcast	Podcast	Interview	UK	https://digitalmedia.sheffield.ac.uk/media/Convivial+conservation+podcastA+Revati+Pandya%2C+Hanna+Pettersson%2C+Valentina+Fiasco+and+Kate+Massarella/1_soy1hv69
13-14/09/2022	Storytelling event and research presentation	The CONVIVA Colloquium		Oral presentation	UK	Link to recording TBC
TBC	Interview about research project	Into the Wild Podcast	Podcast	Interview	UK	Link to recording TBC

Appendix H

Supplementary materials for chapter two

Table H.1. Key informants interviewed for the study.

Code	Date	Location	Interview venue	Interview type	Sex	Age	Occupation	Property
A1	27/01/2020	La Carballeda	Office	Formal	Male	45-60	Local authorities	Depopulation/Land abandonment
A2	28/01/2020	La Carballeda	Public space	Formal	Male	20-45	Business sector	Hospitality sector
A3	Various	La Carballeda	Public space	Informal	Male	60-85	Hunter	Hunting
A4	30/01/2020	La Carballeda	Public space	Formal	Male	45-60	Business sector	Nature tourism sector
A5	30/01/2020	La Carballeda	Home	Formal	Female	20-45	Local authorities	Depopulation/Land abandonment
A6	30/01/2020	Sanabria	Home	Formal	Male	45-60	Civil servant	Hunting
A7	02/02/2020	La Carballeda	Farm visit/participant herding	Formal	Male	45-60	Farmer, sheep	Traditional farming and agriculture
A8	03/02/2020	La Carballeda	Farm visit/participant herding	Formal	Male	60-85	Farmers, cattle	Traditional farming and agriculture
A9	04/02/2020	La Carballeda	Home	Formal	Female	60-85	Business sector	Hospitality sector
A10	04/02/2020	La Carballeda	Office	Formal	Male	45-60	Civil servant	Wildfire prevention
A11	06/02/2020	Sanabria	Farm visit/participant herding	Formal	Female	45-60	Farmer, sheep	Traditional farming and agriculture
A12a, b, c	06/02/2020	Sanabria	Farm visit/participant herding	Formal	Male, female	20-45	Farmers, sheep	Traditional farming and agriculture, Hunting
A13	07/02/2020	Sanabria	Public space	Formal	Male	60-85	Civil servant	Large carnivore conservation
A14	07/02/2020	Sanabria	Home	Formal	Female	20-45	NGO official	Traditional farming and agriculture
A15a, b, c	08/02/2020	Sanabria	Farm visit/participant herding	Formal	Male, female	20-45	Farmers, sheep	Traditional farming and agriculture

A16	11/03/2020	Sanabria	Farm visit/participant herding	Formal	Female	20-45	Farmer, cattle	Traditional farming and agriculture
A17	14/02/2020	La Carballeda	Farm visit/participant herding	Formal	Male	20-45	Farmer, cattle	Traditional farming and agriculture
A18	15/02/2020	Independent	Public space	Formal	Female	20-45	Farmer's union	Traditional farming and agriculture
A19	19/02/2020	La Carballeda	Office	Formal	Male	45-60	Civil servant	Hunting
A20	20/02/2020	La Carballeda	Home	Informal	Male	60-85	Civil servant	Hunting
A21	22/02/2020	La Carballeda	Public space	Informal	Male	60-85	Hunter	Hunting
A22	22/02/2020	Sanabria	Office	Formal	Male	60-85	Local authorities	Depopulation/Land abandonment
A23	27/02/2020	La Carballeda	Farm visit/participant herding	Formal	Male	45-60	Farmer, sheep	Traditional farming and agriculture
A24	02/03/2020	Sanabria	Office	Formal	Male	45-60	Local authorities	Depopulation/Land abandonment
A25	03/03/2020	Sanabria	Public space	Formal	Male	45-60	Local authorities	Countryside and landscape protection
A26	02/03/2020	Sanabria	Home	Formal	Male	20-45	Civil servant	Countryside and landscape protection
A27	03/03/2020	La Carballeda	Office	Formal	Male	20-45	Civil servant	Hunting
A28	18/03/2020	Sanabria	Online	Formal	Male	45-60	Civil servant	Protected area management
A29	09/04/2020	La Carballeda	Online	Formal	Male	45-60	Business sector	Nature tourism sector
R1	15/01/2020	Independent	Public space	Informal	Male	45-60	Research/academia	Large carnivore conservation
R2	11/02/2020	Independent	Online	Formal	Male	20-45	NGO official	Traditional farming and agriculture, Countryside and landscape protection
R3	27/02/2020	Independent	Public space	Informal	Male	45-60	NGO official	Depopulation/Land abandonment, Traditional farming and agriculture
R4	03/06/2020	Independent	Online	Formal	Male	45-60	Research/academia	Large carnivore conservation

Table H.2. Documentaries and programmes on Human-carnivore interactions or rural areas in Spain.

Note: Produced between 2015-2020, which together with media articles and academic publications contextualised primary data.

Code	Year	Location	Name/programme	Description	Initiative/production	URL
D1	2017	Ávila, Asturias, Zamora	Convivencia - Ganadería y Lobos?	Documentary produced on the initiative of a national farming syndicate to give voice to the various stakeholders impacted by the management of the wolf in Spain, asking the question of whether coexistence between wolves and farming is possible. Interviews with farmers, NGO staff, and other relevant stakeholders	UPA - Unión de Pequeños Agricultores y Ganaderos	http://ganaderiaylobos.es/
D2	2018	Zamora, Asturias The Pyrenees	Daños Cero	Interview with a shepherd in the Pyrenees who is using LGDs to defend himself from the wolf, with additional footage from Zamora and Asturias. Produced by one of the most prominent wolf protection NGOs in Spain.	Lobo Marley	https://www.youtube.com/watch?fbclid=IwAR3lu9OeS1xto7y8qQMpxHg1SIOquAF8DAHahkito9koy4QT-oGku0iOuDw&v=kR3L6-4wEsM&feature=youtu.be
D3	2018	Ávila, Asturias, Zamora	Pastando con Lobos	Episode about the coexistence with wolves on 'El Escarabejo Verde': a TV programme which has been working for more than 20 years in the dissemination of all kinds of environmental issues. Interviews of farmers, civil servants and business associated with or impacted by the wolf.	Spanish TV 2	https://www.rtve.es/alacarta/videos/el-escarabajo-verde/escarabajo-verde-pastando-lobos/4866608/
D4	2016, 2018	Ávila, Asturias, Zamora	'Vivir con lobos'. And 'Coexistencia entre la	Interviews with farmers that are coexisting with wolves through preventative methods. Part of the campaign 'Living with Wolves' by a conservation NGO, which	Foundation Ecologistas en Acción	https://www.ecologistasenaccion.org/110007/video-coexistencia-entre-la-

			ganadería extensiva y el lobo'	identified and coordinated around 60 farmers favourable to the coexistence with the wolf.		ganaderia-extensiva-y-el-lobo/
D5	2019	National	Barabecho	Documentary about the impact of depopulation, the importance of small-scale family farms and the people who have decided to stay in the countryside, based on interviews and site visits. Produced by a national farming syndicate.	UPA - Unión de Pequeños Agricultores y Ganaderos	http://barbecho.es/
D6	2015, 2020	Zamora	El Arcón	Episodes about the influence of the wolf on the tourism sector from Sanabria (2015) and SdIC (2020) on El Arcón, a programme on TV CyL that interviews stakeholders associated to natural, cultural and gastronomical heritage and tourism within the Autonomous Community	Castilla Y León TV channel 7	https://www.cyltv.es/programa/el-arcon
D7	2020	Zamora and Asturias	Tierra de Todos	Episode from Spain, part of an audio-visual project of more than 30 testimonies from different sectors from 17 European countries, with the aim of showing that coexistence with large European carnivores is possible. Produced by WWF as a part of an EU life project on carnivore conservation.	WWF and LIFE Euro Large Carnivores	https://www.wwf.es/nuestro-trabajo/especies-y-habitats/grandes-carnivoros-europeos-en-tierra-de-todos/
D8	n/a	La Vera	El Lince en Botas	El Lince con Botas: a documentary series on Canal Sur Extremadura, with interviews of stakeholders about the cultural, environmental and human diversity of the Extremadura community, including episodes about the last shepherds, the impact of the growing hunting sector and Tuberculosis on the traditional farming sector.	El Lince con Botas on TV channel 'Sur Extremadura'	http://libreproducciones.es/?page_id=279

Table H.3. NVivo Code book.

Note: Node A-E provided initial analysis structure, the remaining nodes emerged from the interview and observation data or secondary sources.

Name	Description	Files	References
A. Pathway	The key (historical) events, conditions and factors that have formed the pathway to the current state of Human-carnivore interactions (HCIs).	0	0
<u>Farming system and landscape</u>	Past and current characteristics of the landscape and farming practices.	16	42
<u>Human-Carnivore Interactions</u>	Past and present perceptions, management, attitudes toward wildlife.	0	0
Attitudes	How people used to think about wolves.	8	12
Felix Rodriguez de la Fuente	The impacts of a famous Spanish naturalist.	6	10
Management	Relations to and impacts from administration from the local to the EU level (CAP etc.).	15	25
Stories and folklore	About Carnivores.	7	8
Wildlife populations	Historical population status of carnivores and ungulates in the area.	6	10
<u>Nature protection</u>	How and when protected/special management areas were declared and how they have developed.	0	0
Lago de Sanabria	Natural park.	9	32

Meseta Iberica Biosphere Reserve	Recently declared trans-frontier (Spain and Portugal) UNESCO heritage site, including Sanabria and Sierra de la Culebra.	3	7
Sierra de la Culebra	Regional hunting reserve.	14	40
<u>Population, village</u>	Population and village development through time.	19	31
Perceptions about the past	How do people perceive and remember the village and life in the villages of the past 50 years?	9	17
<u>Time-line</u>	Key dates/years to use for pathways visualization.	15	35
B. Coexistence conditions	Conditions within the SES that enable people to adapt to/ live with large carnivores (LCs). (Q: Why have carnivores survived in this location?)	0	0
<u>Ecological</u>	Ecological conditions.	27	57
Ecosystem services	Quotes relating to awareness of benefits of the wolf, such as suppressing ungulates and thus preventing zoonosis outbreaks.	14	18
Landscape	Habitat conditions, particularly topography, forest and scrub cover.	14	19
Wildlife populations	Presence of prey species, primarily ungulates.	13	20
<u>Economic</u>	Economic conditions.	0	0
Financial instruments	Support for mitigation etc.	8	15
Compensation	Support for loss and damage of livestock.	7	13
Ex-ante payments	Payment for residing in a wolf area.	1	2
<u>Hunting</u>	Income from hunting licenses.	13	33

<u>Tourism</u>	Tourism revenues.	19	68
Iberian Wolf Centre	Impacts of the centre.	5	17
<u>Governance</u>	How carnivores have been governed.	1	1
Hunting and control	Regulation (lethal) of wolf populations.	12	23
Legal frameworks	Laws and regulation protecting wolves.	3	4
<u>Social</u>	Social conditions.	0	0
Attitudes and perceptions	Fear, respect, perceptions of belonging.	30	102
Conflict mitigation	Initiatives aiming to decrease or mitigate conflicts.	6	22
Population density	Of people in the area.	6	10
Traditions and practices	Customs, traditional ecological knowledge, 'being used to' living with LCs etc.	25	63
<u>Z. Explicit solutions</u>	As elucidated by interviewees or that emerged from analysis and interpretation.	26	57
C. Issues	Conditions within the Social-ecological system that increase rural vulnerability and perpetuate negative HCIs.	0	0
<u>1. Depopulation</u>	Quotes relating to causes of and attitudes towards depopulation.	17	32
Attitudes; leave	Urban or rural views about reasons to leave rural areas (e.g. 'raising our kids to leave').	17	38

Attitudes; stay	Urban or rural views about reasons to stay in rural areas (why rural areas are important).	17	46
Infrastructure	Internet, roads etc.	7	16
Job opportunities	Perceptions regarding the availability of rural jobs.	19	61
No opportunities	People claiming that there are no jobs.	13	26
Lack of initiative	People claiming that the problem is not a lack of opportunities but a lack of (private) initiative.	6	14
Outsourcing	The tendency of local and regional administration to outsource services to private companies, often residing outside of the area.	9	18
Loss of community cohesion	Individualisation and deterioration of social bonds.	2	3
Seasonality	The tendency of tourism and visits being concentrated and limited to certain times (summer, holidays).	16	32
Social services	Faltering access to health care, education etc.	15	29
Taxes and financial incentives	Tendency to tax urban and rural areas equally/lack of tax incentives for living and producing in rural areas.	7	16
Unused potential	E.g. mushrooms, deer meat, forestry.	19	41
<u>2. Farming viability</u>	Main issues highlighted by farmers and shepherds.	0	0
Attitudes and perceptions	Urban and rural attitudes towards the countryside, farming and farmers.	22	50

Bureaucracy and administration	Burden and complexity of paperwork.	10	15
Diseases	Afflicting livestock, transmitted from wildlife.	5	8
Distribution of products	Butchers, regulation, farmers markets, middlemen, promotion, awareness.	9	27
Distrust and disunity	Amongst farmers.	8	20
Education levels	Of farmers.	4	7
Financial instruments	Current funding infrastructure and its impacts on farmers.	0	0
CAP	Issues relating to the Common Agricultural Policy.	14	64
Incentives and start-up support	Issues relating to the means needed to start up a farming operation.	11	23
Services to nature	Recognition of farmers' maintenance of public goods.	5	11
Spanish 'piquaresca'	From a typical expression describing how people cheat and exploit the system.	12	16
Guardian dogs	Costs, legal issues, interactions with domestic dogs.	12	23
Profitability and costs	Price of outputs (meat and milk), costs of inputs (feed etc).	16	38
Wolf damages	Killed and injured livestock.	23	63
Compensation	Support for of loss and/or damage to livestock.	14	27
Insurance	For potential wolf damages.	16	27

Statistics	Current figures and the degree to which they represent the reality.	1	2
<u>3. Governance and institutions</u>	Current relationships with the administration and politicians.	0	0
Information, transparency	Of the system that governs HCI.	6	13
Legislation	Laws governing wolves and rural areas.	15	34
North vs. South of Duero	Disparities in wolf management to the northern and southern part of Spain.	13	35
Participation	Degree of participatory decision-making.	15	27
Support	Whether or not farmers feel supported by the administration.	23	49
Trust and efficiency	Perceptions of the administration's responsiveness, responsibility and degree of corruption.	23	53
<u>4. Stereotypes, beliefs</u>	Node gathering perceptions about 'the other' that are replicated throughout different groups and which may contribute to polarisation.	2	2
About farmers	Their traditions, practices, and characteristics.	18	34
About politicians, conservationists and members of the public	For instance farmers' views about tourists.	17	31
About wolves	Rumours, beliefs, stories, and fake news.	26	45

<u>5. Hunting</u>	General info about hunting in the area + perceptions regarding whether hunting is beneficial or not for the maintenance of good HCI.	12	39
Against	Views against (continued) hunting.	12	21
Control	Views advocating for lethal control of wolves, but performed by the administration.	19	33
For	Views that endorse (continued) hunting.	12	30
Friction with tourism	The impacts of hunting on wolf-observation opportunities in areas where the two activities coincide.	6	13
Poaching	The degree to which hunting affect poaching tendencies.	1	3
Prices of game	Price trends on hunting auctions.	8	21
Wolf impact on game	The number of ungulates and the quality of their 'trophies' (antlers etc).	4	4
Zoning	Views and proposals for different management areas for wolves.	10	18
D. Trends	Tendencies within the social-ecological system that may impact future HCI.	0	0
<u>T1. Landscape use</u>	Changing views, purposes and uses of landscapes (from production to recreation?)	28	93
Nature protection and restoration	Rewilding, fauna reintroduction and land abandonment.	15	27

Nature tourism demand	Demand on nature-based experiences and tendencies of nature commodification. Effects caused by the mixing of urban and rural people.	20	42
Friction with locals	The increasing number of (urban) tourists and their impact on local infrastructure and nature.	12	25
Privatisation and commons	Loss of public grazing, communal forests etc.	1	1
<u>T2. Land abandonment impacts</u>		7	10
Biodiversity	Impacts on species associated with the (previous) traditional landscape.	12	22
Population and culture	Preservation of traditional knowledge, practices and culture.	10	14
Scrub, forest	Natural succession of forest communities and associated impacts.	18	33
Wildfires	Wildfire tendencies.	15	24
<u>T3. Livestock preferences and management systems</u>	Management preferences, impacts of livestock subsidies, product demand.	11	24
<u>T4. Wildlife populations</u>	Negative impacts from wildlife populations, associated perceptions and beliefs about wildlife populations.	0	0
Bear		5	11
Lynx		0	0

Ungulates		23	46
Wolf		25	69
<u>T5. Value orientations</u>	Shifts in values regarding the countryside, nature, and wildlife.	0	0
Dietary changes	Food preferences and demand.	3	5
Farmers and farming	Of the profession and its role for sustainable development.	4	6
Pride of coexistence farmers	Locals' perceptions about local/traditional knowledge and capacities of local farmers with regards to the wolf.	15	24
Hunting values	Interest in hunting, perceptions about hunters, generational turnover of hunters.	24	59
Knowledge	Divergent types of knowledge and associated disconnection between different social groups (e.g. urban and rural).	14	18
Stories and emotions	People's encounters with wolves and nature and associated feelings.	18	32
Wildlife	Wildlife value orientations (mutualistic, utilitarian etc).	25	56
<u>T6. Infrastructure</u>	Internet, distribution chains, transport.	4	6
<u>T7. COVID-19</u>	Impacts of the ongoing Covid crisis (beginning March 2020).	6	10
E. Future	What are the key trends, aspirations and drivers within the SES that may affect the pathway(s) towards rural sustainability and resilient human-carnivore coexistence?	0	0
<u>1. Aspirations</u>	What people want/what do they think is needed to improve HCI and the conditions for small-scale farming?	0	0

Economic	The shape and function of future support mechanisms.	0	0
CAP	Changes to the EU agricultural policy.	10	26
Compensation	Changes to the carnivore damage compensation policy.	6	8
Mitigation	Ex-ante payments and programmes to support preventative measures.	16	33
Services to nature, greening	Policies to support and incentivise production in marginalised and challenging areas, e.g. due to the presence of LCs.	8	15
Taxes and incentives	To counter loss of small-scale agriculture and depopulation.	16	30
Environmental	How do people imagine this area in the future, which are their hopes and aspirations?	1	1
Landscapes	Hopes and outlooks for the traditional landscape, shifting baseline syndrome.	8	12
Wildlife populations and management	How do people want wildlife populations to be managed? Where do they want them? In what densities? (Control, hunting and zoning).	21	45
Governance	Aspirations regarding how carnivores should be governed.	13	19
Mediation	How to address and solve conflicts in the future.	11	22
Infrastructure	Needs and aspirations for infrastructure development.	3	3
Distribution	Of rural products: producer-consumer chains, new market places, certification, and advertising.	6	18

Opportunities	Aspects highlighted as promising for future development.	8	12
Social	Aspirations regarding social elements.	0	0
(Re)connection with nature	Environmental and cultural awareness and education.	15	22
Acknowledgement	Desired attitude changes.	16	46
Cooperation and commons	Communal/public ownership and management of natural resources and livestock.	1	2
Professional development	For farmers and rural inhabitants.	5	8
Social services	The ones needed for the persistence of rural areas.	11	17
<u>2. Beliefs about the future</u>	Respondents' answers to the question 'what do you think about the future of this area/where will you and/or your family be in 20-30 years?'	27	39
<u>3. Preparing for LCs</u>	Respondents' views on how areas should act BEFORE the return of LCs in order to mitigate or avoid negative impacts and civil unrest, and the difficulties associated with this preparation.	14	21

Appendix I

Supplementary materials for chapter three

Table I.1 Key informants interviewed for the study.

Note: When the code contains lowercase letters, it means that several informants were present/interviewed on the same occasion.

Location A							
Code	Study area	Interview venue	Interview type	Gender	Age range	Category	Property/specialty*
A1	La Carballeda	Office	Formal	Male	45-60	Local authorities	Depopulation/Land abandonment
A2	La Carballeda	Public space	Formal	Male	20-45	Business sector	Hospitality sector
A3	La Carballeda	Public space	Informal	Male	60-85	Hunter	Hunting
A4	La Carballeda	Public space	Formal	Male	45-60	Business sector	Nature tourism sector/large carnivore conservation
A5	La Carballeda	Home	Formal	Female	20-45	Local authorities	Depopulation/Land abandonment
A6	Sanabria	Home	Formal	Male	45-60	Civil servant	Hunting
A7	La Carballeda	Farm visit/participant herding	Formal	Male	45-60	Sheep farmer	Traditional farming and agriculture
A8	La Carballeda	Farm visit/participant herding	Formal	Male	60-85	Sheep farmer	Traditional farming and agriculture
A9	La Carballeda	Home	Formal	Female	60-85	Business sector	Hospitality sector
A10	La Carballeda	Office	Formal	Male	45-60	Civil servant	Wildfire prevention
A11	Sanabria	Farm visit/participant herding	Formal	Female	45-60	Sheep farmer	Traditional farming and agriculture

A12a, b, c	Sanabria	Farm visit/participant herding	Formal	Male, female	20-45	Cattle farmers	Traditional farming and agriculture, Hunting
A13	Sanabria	Public space	Formal	Male	60-85	Civil servant	Large carnivore conservation
A14	Sanabria	Home	Formal	Female	20-45	NGO official	Traditional farming and agriculture
A15a, b, c	Sanabria	Farm visit/participant herding	Formal	Male, female	20-45	Farmers, sheep	Traditional farming and agriculture
A16	Sanabria	Farm visit/participant herding	Formal	Female	20-45	Cattle farmer	Traditional farming and agriculture
A17	La Carballeda	Farm visit/participant herding	Formal	Male	20-45	Cattle farmer	Traditional farming and agriculture
A18	Independent	Public space	Formal	Female	20-45	Farmer's union	Traditional farming and agriculture
A19	La Carballeda	Office	Formal	Male	45-60	Civil servant	Hunting
A20	La Carballeda	Home	Informal	Male	60-85	Civil servant	Hunting
A21	La Carballeda	Public space	Informal	Male	60-85	Hunter	Hunting
A22	Sanabria	Office	Formal	Male	60-85	Local authorities	Depopulation/Land abandonment
A23	La Carballeda	Farm visit/participant herding	Formal	Male	45-60	Sheep farmer	Traditional farming and agriculture
A24	Sanabria	Office	Formal	Male	45-60	Local authorities	Depopulation/Land abandonment
A25	Sanabria	Public space	Formal	Male	45-60	Local authorities	Countryside and landscape protection
A26	Sanabria	Home	Formal	Male	20-45	Civil servant	Countryside and landscape protection
A27	Regional	Office	Formal	Male	20-45	Regional authorities	Hunting
A28	Regional	Online	Formal	Male	45-60	Regional authorities	Protected area management
A29	La Carballeda	Online	Formal	Male	45-60	Business sector	Nature tourism sector/large carnivore conservation

Location B							
Code	Study area	Interview venue	Interview type	Gender	Age range	Category	Property/specialty*
B1	Outside of PENP	Farm visit/participant herding	Formal	Male	45-60	Cattle farmer/ Farmer's union	Traditional farming and agriculture, Countryside and landscape protection
B2	Within PENP	Office	Formal	Male	45-60	Civil servant	Protected area management
B3	Independent	Online	Formal	Male	45-60	Research/academia	Large carnivore conservation
B4	Within PENP	Farmer/business	Formal	Female	20-45	Dairy farmer/cheese maker	Modern farming and agriculture
B5	Within PENP	Farmer/business	Formal	Male	20-45	Goat farmer/cheese maker	Traditional farming and agriculture
B6	Within PENP	Office	Formal	Male	20-45	Local authorities	Farming and agriculture
B7	Within PENP	Office	Formal	Male	20-45	Local authorities	Depopulation/Land abandonment, Traditional farming and agriculture
B8	Within PENP	Office	Formal	Male	45-60	Civil servant/business sector	Depopulation/Land abandonment, Traditional farming and agriculture
B9	Within PENP	Public space	Formal	Male	45-60	Civil servant	Large carnivore conservation/Nature restoration

B10ab	Within PENP	Farm visit/participant herding	Informal	Female, male	60-85	Dairy farmers/cheese makers	Traditional farming and agriculture
B11	Regional	Office	Informal	Male	45-60	Policy advocate	Traditional farming and agriculture, Countryside and landscape protection
B12	Within PENP	Public space	Formal	Male	45-60	Cattle farmer	Traditional farming and agriculture, Countryside and landscape protection
B13	Independent	Public space	Formal	Male	45-60	NGO official	Large carnivore conservation
B14	Independent	Public space	Formal	Male	20-45	Research/academia /Cattle farmer	Traditional farming and agriculture, Countryside and landscape protection
B15	Within PENP	Researcher/Civil servant	Formal	Female	20-45	Civil servant	Countryside and landscape protection/Species protection
B16	Within PENP	Public space	Formal	Male	20-45	NGO oficial/local asociación	Traditional farming and agriculture, Countryside and landscape protection
B17	Within PENP	Public space	Formal	Male	60-85	Research/academia	Traditional farming and agriculture, Countryside and landscape protection
B18	Within PENP	Farm visit/participant herding	Formal	Male	20-45	Dairy farmer/cheese maker	Traditional farming and agriculture
B19	Within PENP	Farm visit/participant herding	Formal	Male	60-85	Dairy farmer/cheese maker	Traditional farming and agriculture

B20	Within PENP	Farm visit/participant herding	Formal	Male	45-60	Nature tourism sector /agriculture	Hospitality, Traditional farming and agriculture
B21	Within PENP	Office	Formal	Male	20-45	Civil servant/researcher	Traditional farming and agriculture, protected area management
B22	Regional	Office	Formal	Male	45-60	Regional authorities	Protected area management
B23	Within PENP	Farm visit/participant herding	Formal	Male	20-45	Dairy farmer/cheese maker	Traditional farming and agriculture
B24	Within PENP	Public space	Formal	Female	45-60	Civil servant/ Local association	Nature tourism sector
B25	Outside of PENP	Home	Formal	Male	45-60	Cattle farmer/hunter	Hunting, Traditional farming and agriculture
B26	Outside of PENP	Farm visit/participant herding	Formal	Male	20-45	Sheep farmer	Traditional farming and agriculture
B27	Within PENP	Home	Formal	Male	45-60	NGO official	Species conservation
B28	Outside of PENP	Office	Formal	Male	45-60	Civil servant	Protected area management
B29	Within PENP	Office	Formal	Male	45-60	Cattle farmer	Traditional farming and agriculture
B30	Regional	Office	Formal	Male	45-60	Regional authorities	Large carnivore conservation
B31	Outside of PENP	Office	Formal	Male	45-60	Civil servant	Large carnivore conservation

Location C							
Code	Study area	Interview venue	Interview type	Gender	Age	Category	Property/specialty*
C1	La Vera	Office	Formal	Male	45-60	Local authorities	Depopulation/land abandonment
C2	La Vera	Office	Formal	Male	45-60	Village resident/local association	Hunting
C3	La Vera	Office	Formal	Female	20-45	Civil servant/Education	Large carnivore conservation/hunting
C4a	La Vera	Farm visit/participant herding	Formal	Male	45-60	Village resident/local association/agriculture	Traditional farming and agriculture
C4b	La Vera	Farm visit/participant herding	Formal	Female	45-60	Former shepherd/local association/agriculture	Traditional farming and agriculture
C5ab	La Vera	Farm visit/participant herding	Formal	Male, Female	45-60	Goat farmers	Traditional farming and agriculture
C6	La Vera	Farm visit/participant herding	Formal	Male	60-85	Goat farmers	Traditional farming and agriculture,
C7	La Vera	Public space	Formal	Male	45-60	Cattle farmers	Traditional farming and agriculture
C8	La Vera	Public space	Formal	Male	20-45	Village resident	Large carnivore conservation
C9	La Vera	Public space	Formal	Male	45-60	Hunting sector	Hunting
C10	La Vera	Home	Formal	Male	45-60	Media/ conservationist	Nature restoration/large carnivore conservation

C11	Regional	Public space	Formal	Male	45-60	Academia/research	Traditional farming and agriculture, Countryside and landscape protection
C12a	La Vera	Public space	Formal	Male	45-60	Civil servant	Protected area management/species protection
C12b	La Vera	Public space	Formal	Male	45-60	Civil servant	Protected area management/species protection
C13	La Vera	Public space	Formal	Male	45-60	Farmer's union/cattle farmer	Traditional farming and agriculture
C14	La Vera	Farm visit/participant herding	Formal	Male	60-85	Cattle farmer	Traditional farming and agriculture
C15	La Vera	Office	Formal	Male	60-85	Local authorities	Traditional farming and agriculture
C16a	La Vera	Public space	Formal	Male, female	20-45	Village residents	Large carnivore conservation
C16b	La Vera	Public space	Informal	Male	60-85	Retired goat farmer	Traditional farming and agriculture
C17ab	La Vera	Farm visit/participant herding	Formal	Male	45-60	Goat farmers	Traditional farming and agriculture
C18	La Vera	Public space	Formal	Male	20-45	Cattle farmer	Traditional farming and agriculture
C19	La Vera	Home	Formal	Male	45-60	NGO official/local association	Traditional farming and agriculture, large carnivore conservation

C20	La Vera	Home	Informal	Female	20-45	Village resident	Traditional farming and agriculture
C21	Independent	Office	Formal	Male	45-60	Research/academia	Veterinary science
C22	La Vera	Office	Formal	Male	45-60	Civil servant	Species conservation/nature restoration
C23	La Vera	Office	Formal	Male	45-60	Civil servant	Farming and agriculture
C24	La Vera	Office	Formal	Female	20-45	Civil servant/business sector	Nature tourism sector/depopulation
C25	La Vera	Public space	Formal	Male	20-45	Hunter/village resident	Hunter
C26	La Vera	Public space	Formal	Male	20-45	Goat farmer	Traditional farming and agriculture
C27	La Vera	Public space	Formal	Male	45-60	Hunting sector	Hunting
C28	Regional	Public space	Formal	Female	45-60	Regional authorities	Large carnivore conservation
C29a**	Independent	Farm visit/participant herding	Formal	Male	60-85	Sheep farmer/hunting sector	Traditional farming and agriculture, hunting
C29b**	Independent	Farm visit/participant herding	Formal	Male	60-85	Sheep farmer	Traditional farming and agriculture

Independent stakeholders							
Code	Location	Interview venue	Interview type	Gender	Age	Category	Property/specialty*
R1	Independent	Public space	Informal	Male	45-60	Research/academia	Large carnivore conservation
R2	Independent	Online	Formal	Male	20-45	NGO official	Traditional farming and agriculture, Countryside and landscape protection
R3	Independent	Public space	Informal	Male	45-60	NGO official	Depopulation/Land abandonment, Traditional farming and agriculture

* *Property/specialty denotes the particular knowledge, position or profession for which the informant was interviewed.*

** *These stakeholders were located in the area of the lynx reintroduction program in the south of the region. The program, is a model/inspiration for the wolf management plan in the region. Their experiences of the project were thus relevant to explore the possible implications of the wolf program in La Vera.*

Table I.2. Documentaries and programs on Human-carnivore interactions or rural areas in Spain.

Code	Year	Region	Name/ program	Description	Initiative/ production	URL
D1	2017	Ávila, Asturias, Zamora	Convivencia - Ganadería y Lobos?	Documentary produced on the initiative of a national farming about whether coexistence between wolves and farming is possible. Interviews with farmers, NGO staff, and other relevant stakeholders	UPA - Unión de Pequeños Agricultores y Ganaderos	http://ganaderiaylobos.es/
D2	2018	Zamora, Asturias The Pyrenees	Daños Cero	Interview with a shepherd in the Pyrenees who is using LGDs for wolf defence, with additional footage from Zamora and Asturias. Produced by one of the most prominent wolf protection NGOs in Spain.	Lobo Marley	https://www.youtube.com/watch?fbclid=IwAR3lu9OeS1xto7y8qQMpxHg1SIOquAF8DAHahkito9koy4QT-oGku0iOuDw&v=kR3L6-4wEsM&feature=youtu.be
D3	2018	Ávila, Asturias, Zamora	Pastando con Lobos	Episode about coexistence with wolves on 'El Escarabejo Verde': a TV programme which has been working for over 20 years in the dissemination of environmental issues. Interviews of farmers, civil servants and business associated with or impacted by the wolf.	Spanish TV 2	https://www.rtve.es/alacarta/videos/el-escarabajo-verde/escarabajo-verde-pastando-lobos/4866608/
D4	2016, 2018	Ávila, Asturias, Zamora	“Vivir con lobos”, and “Coexistencia entre la ganadería extensiva y el lobo”	Interviews with farmers who are coexisting with wolves through preventative methods. Part of the campaign 'Living with Wolves' by a conservation NGO, which identified and coordinated around 60 farmers in favour of coexistence.	Foundation Ecologistas en Acción	https://www.ecologistasenaccion.org/110007/video-coexistencia-entre-la-ganaderia-extensiva-y-el-lobo/
D5	2019	National	Barabecho	Documentary about the impact of depopulation, the importance of small-scale family farms and the people who have decided to stay in the countryside, based on interviews and site visits. Produced by a national farming syndicate.	UPA - Unión de Pequeños Agricultores y Ganaderos	http://barbecho.es/

D6	2015, 2020	Zamora	El Arcón	Episodes about the influence of the wolf on the tourism sector from Sanabria (2015) and La Culebra (2020) on El Arcón, a programme on TV CyL that interviews stakeholders associated to natural, cultural and gastronomical heritage and tourism within CyL.	Castilla Y León TV channel 7	https://www.cyltv.es/programa/el-arcon
D7	2020	Zamora and Asturias	Tierra de Todos	Episode from Spain, part of an audio-visual project of more than 30 testimonies from different sectors from 17 European countries, with the aim of showing that coexistence with large European carnivores is possible. Produced by WWF as a part of an EU life project on carnivore conservation.	WWF and LIFE Euro Large Carnivores	https://www.wwf.es/nuestro_trabajo/especies_y_habitats/grandes_carnivoros_europeos_en_tierra_de_todos/
D8	n/a	La Vera	El Lince en Botas	El Lince con Botas: a documentary series on Canal Sur Extremadura, with interviews of stakeholders about the cultural, environmental and human diversity of the Extremadura community, including episodes about the last shepherds, the impact of the growing hunting sector and Tuberculosis on the traditional farming sector.	El Lince con Botas on TV channel 'Sur Extremadura'	http://libreproducciones.es/?page_id=279

Table I.3. NVivo Code book.

Note: Initial structure deriving from the coexistence framework (grey and colored fields). The remaining themes emerged from the interview and observation data or secondary sources during the course of the analysis.

Main category	Framework codes	Description
1. Coexistence conditions	Conditions highlighted as instrumental for ensuring, enabling or improving local coexistence capacities	
	Effective institutions - managed risk	
	Conflict mitigation	Programs and initiatives to mediate disputes and improve attitudes to/awareness of wolves in local communities
	Financial instruments	
	<i>Compensation</i>	
	<i>Ex-ante payments</i>	
	Knowledge dissemination	About wolves or the governance of them
	<i>Lobo Iberico Center</i>	Interpretation center in S-LC
	Legal frameworks	Laws and regulation which protects wolves
	Traditional livestock practices	Guardian dogs, fences, nighttime enclosures
	Wolf extraction	Approaches to lethal control and zooning
	<i>Current hunting practices</i>	Descriptions
<i>Lethal control</i>	Extraction by administration	

	<i>Wolf hunting</i>	Extraction by hunters (trophies)
Social Legitimacy		
	Attitudes and perceptions	Sense/perceptions of wolves belonging to the system, respect, fascination, fear (lack thereof), responsibility etc. (i.e. tolerance/acceptance attitudes)
	Economic benefits	
	<i>Hunting incomes</i>	Income from hunting licenses
	<i>Tourism</i>	Incomes and other benefits from wolf tourism
	<i>Ecosystem services</i>	Awareness of benefits of the wolf, such as regulation of sick animals and mitigation of zoonosis outbreaks
Wolf persistence		
SES factors and idiosyncrasies		
	Current characteristics	
	<i>Hunting sector</i>	Characteristics and perceptions of the local hunting sector
	<i>Landscape</i>	Habitat conditions (topography, forest and scrub cover)
	<i>Population density</i>	Geography and density of human habitation and (vs natural surroundings)
	<i>Wildlife populations</i>	Specifically ungulates

	<p>Historic factors</p>	<p>Key (historical) events, conditions, and factors within the social-ecological system (SES) that have shaped the current state of Human-carnivore interactions (HCI)</p>
	<p>HCI</p>	<p>Past to present interactions, management, attitudes and perceptions toward Large Carnivores (LCs) and other wildlife</p>
	<p><i>Attitudes</i></p>	<p>How people used to think about wolves</p>
	<p><i>Felix Rodriguez de la Fuente</i></p>	<p>The influence of a famous Spanish naturalist on HCI</p>
	<p><i>Management</i></p>	<p>How carnivores were governed, from the local to the EU level</p>
	<p><i>Stories and folklore</i></p>	<p>About LCs and the encounters with them</p>
	<p><i>Wildlife populations</i></p>	<p>Historical population status and dynamics of carnivores and ungulates in the area</p>
	<p><i>Disappearance</i></p>	<p>When and how did wolves disappear/become extinct</p>
	<p><i>Return</i></p>	<p>When and how did wolves return</p>
	<p>Nature protection</p>	<p>How and when protected/special management areas were declared, their characteristics and how they have developed</p>
	<p><i>La Sierra</i></p>	<p>Hunting reserve</p>
	<p><i>Lago de Sanabria</i></p>	<p>Natural park</p>
	<p><i>Meseta Iberica Biosphere Reserve</i></p>	<p>Recently declared trans-frontier (Spain and Portugal) UNESCO heritage site, including Sanabria and Sierra de la Culebra.</p>

	<i>Picos de Europa</i>	National park
	<i>Sierra de la Culebra</i>	Regional hunting reserve
	Social and cultural factors	Population and village development and dynamics, cultural traditions, practices and management of the land
	<i>Farming system and landscape</i>	Past to current characteristics of the landscape and farming practices
	<i>Perceptions about the past</i>	Villages, quality of life etc.
2. Threats and vulnerabilities	Factors within the SES that are inhibiting, preventing or undermining local coexistence capacities	
	Depopulation	
	Rural abandonment: trends, causes and concerns	
	Leave attitudes	Expressed reasons to leave rural areas and why life in urban areas is more attractive
	Infrastructure	Issues related to roads, internet etc.
	Job opportunities	Perceptions about professional development options in rural areas
	<i>Lack of initiative</i>	Views that there are local opportunities, but that local people are unwilling or unable to take advantage of them

	<i>No opportunities</i>	Views that there are few local professional options or development routes
	<i>Outsourcing</i>	Local contracts and jobs outsourced to actors and firms who do not reside in the area
	Loss of community cohesion	Effects of depopulation and individualism on local abilities to collaborate and support each other
	Seasonality	Tendencies of tourists and associated business opportunities to be concentrated to a few months of the year
	Social services	Schools, health care etc.
	Taxes and incentives	Lack of economic benefits and support
	Underused potential	E.g. mushrooms, deer meat, forestry
	Farming viability	
	Factors relating to the resilience of small-scale traditional farm operations	
	Bureaucracy	Administrative/paper-work burden
	Distribution of products	Elements that hinder distinction of products and short market chains: butchers, regulation, farmers' markets, intermediaries, promotion, awareness
	<i>Geographic protection and brands</i>	Certification and brands for quality: lack thereof or barriers to entry

	<i>Industrial vs traditional</i>	Processes and factors that promote industrial over traditional farming practices
	Distrust and disunity	Within the farming community
	Education levels	Of farmers
	Financial instruments	
	<i>CAP</i>	
	<i>Incentives and start-up support</i>	
	<i>Services to nature</i>	(Lack of) recognition of farmers' maintenance of public goods
	<i>Spanish piquaresca</i>	From a local expression describing how people (try to) cheat, corrupt and benefit from the system
	Land access	Pastures and barns etc.
	Livestock diseases	Tuberculosis and brucellosis
	Modernization, quality of life	Discrepancy between life of farmers and the rest of society
	Profitability and costs	Price of outputs (meat and milk), costs of inputs (feed etc)
	Status, societal norms	Urban and rural attitudes towards the countryside, farming and farmers
	Wolf damages and mitigation	Negative impacts of wolves on livestock and game
	<i>Compensation</i>	Support for of loss and/or damage to livestock

	<i>Domestic dogs</i>	Damages of domestic dogs on livestock and the possible confusion of these with wolf damages
	<i>Guardian dogs</i>	Costs, effectiveness, legal support, interactions with domestic dogs and members of the public
	<i>Insurance</i>	Costs, bureaucracy, perceived fairness
	<i>Statistics</i>	Current figures and the degree to which they represent the reality
<p style="text-align: center;">Formal institutions</p> <p>Efficiency, transparency, perceptivity of governing administrations, institutions and funding programs</p>		
	Efficiency, trust and legitimacy	People's perception about the (in)capacity of local and regional administrations to perform their intended function and adhere to local (rural) needs.
	Fortress conservation, compositionism	Perceptions related to directions of conservation policy that excludes local people, and which fails to perform holistic biocultural diversity conservation
	Information, transparency	Provision and access to information about landscape and species governance
	Laws and regulation	
	Participation	Degree of participatory decision-making
	Support	Ability of institutions to provide required support
	Wolf management plan	Issues relating to the development and function of the plan

	<p><i>North vs. South of Duero</i></p>	<p>Discrepancy in governance and its social and ecological effects</p>
	<p>Stereotypes, beliefs</p> <p>Node gathering perceptions about "the other" that are replicated throughout different groups and which may contribute to polarization</p>	
	<p>About farmers</p>	
	<p>About politicians, conservationists and tourists</p>	
	<p>About wolves</p>	<p>Incongruous beliefs about wolves</p>
	<p>Media</p>	<p>Tendencies and impacts of news- and social media on HCI</p>
	<p>Knowledge silos, disconnection</p> <p>How (types of) knowledge is transferred and valued along urban-rural, administration-local and research-practice communities</p>	
	<p>Hunting</p> <p>General info about hunting and the hunting sector; views and perceptions regarding lethal control and hunting of wolves; trends and values related to the hunting sector</p>	
	<p>Friction with tourism</p>	<p>The impact on hunting on wildlife watching interests</p>
	<p>Hunting ban</p>	<p>Popular movement for the prohibition of wolf hunting</p>
	<p>Hunting values</p>	<p>Societal perceptions and values associated with being a hunter</p>

	Poaching	Of wolves
	Prices of game	Price dynamics of hunting permits (wolves and ungulates)
	Resistance to hunting practices	Due to practical implications
	Wolf impact on game	Local ungulate populations and trophy sector
3. Trends	Tendencies within the SES that are impacting traditional farming practices, rural areas and Human-carnivore interactions	
	T1. Landscape use	
	Changing uses and perceived purpose of rural landscapes	
	Land ownership, commons	Changes in the way rural land is owned and (communally) managed
	Nature and wildlife tourism	Demand on nature-based experiences and tendencies of nature commodification and its implications on traditional practices
	<i>Friction with locals</i>	Visitors vs residents
	Nature protection and restoration	Conservation, rewilding, and restoration perceptions and agendas
	“Neo-rurals”	New types of village residents moving in
	T2. Land abandonment	
Processes of rural abandonment and decrease of traditional farming practices and associated impacts on the social-ecological system		

	Biodiversity	
	Population, culture, practices	
	Scrub, forest, pastures	
	Wildfires	
	T3. Livestock preferences and management systems	
	Changes in livestock types, quantities and management practices	
	T4. Wildlife populations	
	Changes related to wildlife populations dynamics and numbers; associated perceptions and beliefs about wildlife populations	
	Bears	
	Lynx	
	Ungulates	
	<i>Diseases</i>	
	Wolves	
	<i>Bold wolves</i>	Changed hunting patterns leading to increased overlap with humans
	T5. Value orientations	
Of the countryside, nature and wildlife and associated impacts on HCI		
Diets and consumption	Changes to food preferences and demand	

	Farmers and farming	Perceptions and values associated to farmers and being a farmer
	<i>Pride of coexistence farmers</i>	Increasing status and recognition of farmers who are coexisting with wolves, tendencies of adopting them as ambassadors for wolf conservation agendas
	Wildlife value orientation	Shifting values and perceptions of wildlife and associated impacts on HCI
	<i>Stories and emotions</i>	Inspired by LCs and encounters with them
	T6. Infrastructure	
	Internet, distribution chains, transport	
	T7. Covid-19	
Impacts of the Corona pandemic (which broke out during fieldwork) on local systems		
4. Lessons from return	Impacts of wolf return on SES and associated policy response, mistakes and successes. From Location B (+ perspectives from Ávila and Guadarrama)	
5. Preparing for LCs	Views on how areas should act before LC return in order to mitigate or avoid negative impacts and social tensions, and the difficulties associated with this preparation.	
	Case C	
	<i>Current strategy</i>	Perceptions about whether, and how, the administration is preparing for LCs (strategy and methods for enhancing local coexistence conditions)
	<i>Reaction, impact</i>	Informants' beliefs about how the local system (social dynamics, hunting and farming practices) will be impacted by wolf return.

	<i>When</i>	Informants' beliefs about when wolves will be back to case C
	Proposed actions	Respondents' aspirations (from case C) and advice (from respondents in case A and B) on how to prepare local systems for the return of LCs
	<i>Ecological interventions</i>	
	<i>Science and research</i>	
	<i>Social interventions</i>	
6. Future	Informant's wishes and beliefs about the future of the local system and the relations with wolves within them.	
	1. Aspirations and needs	
	What do informants want/what do they think is needed to maintain, enhance or improve HCI and the conditions for small-scale farming.	
	Environmental	
	<i>Landscapes</i>	Appearance and function
	<i>Wildlife populations and management</i>	How do people want wildlife populations to be managed? Where do they want them? In what densities? (Control, hunting and zoning)
	Funds, support	
	<i>CAP</i>	Changes to the EU agricultural policy
	<i>Compensation</i>	Of livestock damages
	<i>Infrastructure</i>	For farms and rural communities

	<i>Services to nature, greening</i>	Recognition of traditional practices and rural biodiversity to ecosystem functioning, benefit provision and resiliency
	<i>Taxes and incentives</i>	To counter loss of small-scale agriculture and depopulation
	Governance	
	<i>Distribution, distinction</i>	Of products from farms that are beneficial for biocultural diversity
	<i>Mediation; pragmatism; transparency</i>	Of programs, policies and in human-human relations
	<i>Mitigation</i>	Ex-ante payments and programs to support preventative measures and enhance adaptive capacities
	<i>Place-based management, participatory governance</i>	Perceptivity of administration to local characteristics and associated policy design
	<i>Policy and programs</i>	Adjustments and innovation in rural/species governance
	Social	
	<i>(Re)connection with nature</i>	Environmental and cultural education etc.
	<i>Acknowledgement</i>	Desired attitude changes with relation to traditional practice and species
	<i>Cooperation and commons</i>	Aspirations related to the (return of) communal management of lands and flocks

	<i>Professional development</i>	To enable modernization of traditional practices and livelihoods
	<i>Social services</i>	In rural communities
	2. Beliefs about the future	
	Informants' answers to the question "what do you think about the future of this area/where will this area be in 20-30 years?"	
	Coexistence, possible	
Coexistence, impossible		
8. Zoning	Informants' perceptions and ideas about how LCs are, could or should be governed on a territorial level	

Appendix J Supplementary materials for chapter four

Table J.1 Key informants interviewed for the study (case study A-C and independent stakeholders).

Note: When the code contains lowercase letters, it means that several informants were present/interviewed on the same occasion.

Location A							
Code	Study area	Interview venue	Interview type	Gender	Age range	Category	Property/specialty*
A1	La Carballeda	Office	Formal	Male	45-60	Local authorities	Depopulation/Land abandonment
A2	La Carballeda	Public space	Formal	Male	20-45	Business sector	Hospitality sector
A3	La Carballeda	Public space	Informal	Male	60-85	Hunter	Hunting
A4	La Carballeda	Public space	Formal	Male	45-60	Business sector	Nature tourism sector/large carnivore conservation
A5	La Carballeda	Home	Formal	Female	20-45	Local authorities	Depopulation/Land abandonment
A6	Sanabria	Home	Formal	Male	45-60	Civil servant	Hunting
A7	La Carballeda	Farm visit/participant herding	Formal	Male	45-60	Sheep farmer	Traditional farming and agriculture
A8	La Carballeda	Farm visit/participant herding	Formal	Male	60-85	Sheep farmer	Traditional farming and agriculture
A9	La Carballeda	Home	Formal	Female	60-85	Business sector	Hospitality sector
A10	La Carballeda	Office	Formal	Male	45-60	Civil servant	Wildfire prevention
A11	Sanabria	Farm visit/participant herding	Formal	Female	45-60	Sheep farmer	Traditional farming and agriculture

A12a, b, c	Sanabria	Farm visit/participant herding	Formal	Male, female	20-45	Cattle farmers	Traditional farming and agriculture, Hunting
A13	Sanabria	Public space	Formal	Male	60-85	Civil servant	Large carnivore conservation
A14	Sanabria	Home	Formal	Female	20-45	NGO official	Traditional farming and agriculture
A15a, b, c	Sanabria	Farm visit/participant herding	Formal	Male, female	20-45	Farmers, sheep	Traditional farming and agriculture
A16	Sanabria	Farm visit/participant herding	Formal	Female	20-45	Cattle farmer	Traditional farming and agriculture
A17	La Carballeda	Farm visit/participant herding	Formal	Male	20-45	Cattle farmer	Traditional farming and agriculture
A18	Independent	Public space	Formal	Female	20-45	Farmer's union	Traditional farming and agriculture
A19	La Carballeda	Office	Formal	Male	45-60	Civil servant	Hunting
A20	La Carballeda	Home	Informal	Male	60-85	Civil servant	Hunting
A21	La Carballeda	Public space	Informal	Male	60-85	Hunter	Hunting
A22	Sanabria	Office	Formal	Male	60-85	Local authorities	Depopulation/Land abandonment
A23	La Carballeda	Farm visit/participant herding	Formal	Male	45-60	Sheep farmer	Traditional farming and agriculture
A24	Sanabria	Office	Formal	Male	45-60	Local authorities	Depopulation/Land abandonment
A25	Sanabria	Public space	Formal	Male	45-60	Local authorities	Countryside and landscape protection
A26	Sanabria	Home	Formal	Male	20-45	Civil servant	Countryside and landscape protection
A27	Regional	Office	Formal	Male	20-45	Regional authorities	Hunting
A28	Regional	Online	Formal	Male	45-60	Regional authorities	Protected area management
A29	La Carballeda	Online	Formal	Male	45-60	Business sector	Nature tourism sector/large carnivore conservation

Location B							
Code	Study area	Interview venue	Interview type	Gender	Age range	Category	Property/specialty*
B1	Outside of PENP	Farm visit/participant herding	Formal	Male	45-60	Cattle farmer/ Farmer's union	Traditional farming and agriculture, Countryside and landscape protection
B2	Within PENP	Office	Formal	Male	45-60	Civil servant	Protected area management
B3	Independent	Online	Formal	Male	45-60	Research/academia	Large carnivore conservation
B4	Within PENP	Farmer/business	Formal	Female	20-45	Dairy farmer/cheese maker	Modern farming and agriculture
B5	Within PENP	Farmer/business	Formal	Male	20-45	Goat farmer/cheese maker	Traditional farming and agriculture
B6	Within PENP	Office	Formal	Male	20-45	Local authorities	Farming and agriculture
B7	Within PENP	Office	Formal	Male	20-45	Local authorities	Depopulation/Land abandonment, Traditional farming and agriculture
B8	Within PENP	Office	Formal	Male	45-60	Civil servant/business sector	Depopulation/Land abandonment, Traditional farming and agriculture
B9	Within PENP	Public space	Formal	Male	45-60	Civil servant	Large carnivore conservation/Nature restoration
B10ab	Within PENP	Farm visit/participant herding	Informal	Female, male	60-85	Dairy farmers/cheese makers	Traditional farming and agriculture

B11	Regional	Office	Informal	Male	45-60	Policy advocate	Traditional farming and agriculture, Countryside and landscape protection
B12	Within PENP	Public space	Formal	Male	45-60	Cattle farmer	Traditional farming and agriculture, Countryside and landscape protection
B13	Independent	Public space	Formal	Male	45-60	NGO official	Large carnivore conservation
B14	Independent	Public space	Formal	Male	20-45	Research/academia /Cattle farmer	Traditional farming and agriculture, Countryside and landscape protection
B15	Within PENP	Researcher/Civil servant	Formal	Female	20-45	Civil servant	Countryside and landscape protection/Species protection
B16	Within PENP	Public space	Formal	Male	20-45	NGO official/local association	Traditional farming and agriculture, Countryside and landscape protection
B17	Within PENP	Public space	Formal	Male	60-85	Research/academia	Traditional farming and agriculture, Countryside and landscape protection
B18	Within PENP	Farm visit/participant herding	Formal	Male	20-45	Dairy farmer/cheese maker	Traditional farming and agriculture
B19	Within PENP	Farm visit/participant herding	Formal	Male	60-85	Dairy farmer/cheese maker	Traditional farming and agriculture
B20	Within PENP	Farm visit/participant herding	Formal	Male	45-60	Nature tourism sector /agriculture	Hospitality, Traditional farming and agriculture

B21	Within PENP	Office	Formal	Male	20-45	Civil servant/researcher	Traditional farming and agriculture, protected area management
B22	Regional	Office	Formal	Male	45-60	Regional authorities	Protected area management
B23	Within PENP	Farm visit/participant herding	Formal	Male	20-45	Dairy farmer/cheese maker	Traditional farming and agriculture
B24	Within PENP	Public space	Formal	Female	45-60	Civil servant/ Local association	Nature tourism sector
B25	Outside of PENP	Home	Formal	Male	45-60	Cattle farmer/hunter	Hunting, Traditional farming and agriculture
B26	Outside of PENP	Farm visit/participant herding	Formal	Male	20-45	Sheep farmer	Traditional farming and agriculture
B27	Within PENP	Home	Formal	Male	45-60	NGO official	Species conservation
B28	Outside of PENP	Office	Formal	Male	45-60	Civil servant	Protected area management
B29	Within PENP	Office	Formal	Male	45-60	Cattle farmer	Traditional farming and agriculture
B30	Regional	Office	Formal	Male	45-60	Regional authorities	Large carnivore conservation
B31	Outside of PENP	Office	Formal	Male	45-60	Civil servant	Large carnivore conservation

Location C							
Code	Study area	Interview venue	Interview type	Gender	Age	Category	Property/specialty*
C1	La Vera	Office	Formal	Male	45-60	Local authorities	Depopulation/land abandonment
C2	La Vera	Office	Formal	Male	45-60	Village resident/local association	Hunting
C3	La Vera	Office	Formal	Female	20-45	Civil servant/Education	Large carnivore conservation/hunting
C4a	La Vera	Farm visit/participant herding	Formal	Male	45-60	Village resident/local association/agriculture	Traditional farming and agriculture
C4b	La Vera	Farm visit/participant herding	Formal	Female	45-60	Former shepherd/local association/agriculture	Traditional farming and agriculture
C5ab	La Vera	Farm visit/participant herding	Formal	Male, Female	45-60	Goat farmers	Traditional farming and agriculture
C6	La Vera	Farm visit/participant herding	Formal	Male	60-85	Goat farmers	Traditional farming and agriculture,
C7	La Vera	Public space	Formal	Male	45-60	Cattle farmers	Traditional farming and agriculture
C8	La Vera	Public space	Formal	Male	20-45	Village resident	Large carnivore conservation
C9	La Vera	Public space	Formal	Male	45-60	Hunting sector	Hunting
C10	La Vera	Home	Formal	Male	45-60	Media/ conservationist	Nature restoration/large carnivore conservation

C11	Regional	Public space	Formal	Male	45-60	Academia/research	Traditional farming and agriculture, Countryside and landscape protection
C12a	La Vera	Public space	Formal	Male	45-60	Civil servant	Protected area management/species protection
C12b	La Vera	Public space	Formal	Male	45-60	Civil servant	Protected area management/species protection
C13	La Vera	Public space	Formal	Male	45-60	Farmer's union/cattle farmer	Traditional farming and agriculture
C14	La Vera	Farm visit/participant herding	Formal	Male	60-85	Cattle farmer	Traditional farming and agriculture
C15	La Vera	Office	Formal	Male	60-85	Local authorities	Traditional farming and agriculture
C16a	La Vera	Public space	Formal	Male, female	20-45	Village residents	Large carnivore conservation
C16b	La Vera	Public space	Informal	Male	60-85	Retired goat farmer	Traditional farming and agriculture
C17ab	La Vera	Farm visit/participant herding	Formal	Male	45-60	Goat farmers	Traditional farming and agriculture
C18	La Vera	Public space	Formal	Male	20-45	Cattle farmer	Traditional farming and agriculture
C19	La Vera	Home	Formal	Male	45-60	NGO official/local association	Traditional farming and agriculture, large carnivore conservation

C20	La Vera	Home	Informal	Female	20-45	Village resident	Traditional farming and agriculture
C21	Independent	Office	Formal	Male	45-60	Research/academia	Veterinary science
C22	La Vera	Office	Formal	Male	45-60	Civil servant	Species conservation/nature restoration
C23	La Vera	Office	Formal	Male	45-60	Civil servant	Farming and agriculture
C24	La Vera	Office	Formal	Female	20-45	Civil servant/business sector	Nature tourism sector/depopulation
C25	La Vera	Public space	Formal	Male	20-45	Hunter/village resident	Hunter
C26	La Vera	Public space	Formal	Male	20-45	Goat farmer	Traditional farming and agriculture
C27	La Vera	Public space	Formal	Male	45-60	Hunting sector	Hunting
C28	Regional	Public space	Formal	Female	45-60	Regional authorities	Large carnivore conservation
C29a**	Independent	Farm visit/participant herding	Formal	Male	60-85	Sheep farmer/hunting sector	Traditional farming and agriculture, hunting
C29b**	Independent	Farm visit/participant herding	Formal	Male	60-85	Sheep farmer	Traditional farming and agriculture

Independent stakeholders							
Code	Location	Interview venue	Interview type	Gender	Age	Category	Property/specialty*
R1	Independent	Public space	Informal	Male	45-60	Research/academia	Large carnivore conservation
R2	Independent	Online	Formal	Male	20-45	NGO official	Traditional farming and agriculture, Countryside and landscape protection
R3	Independent	Public space	Informal	Male	45-60	NGO official	Depopulation/Land abandonment, Traditional farming and agriculture

* *Property/specialty denotes the particular knowledge, position or profession for which the informant was interviewed.*

** *These stakeholders were located in the area of the lynx reintroduction program in the south of the region. The program is a model/inspiration for the wolf management plan in the region. Their experiences of the project were thus relevant to explore the possible implications of the wolf program in La Vera.*

Table J.2 Documentaries and programs on Human-carnivore interactions or rural areas in Spain.

Code	Year	Region	Name/ program	Description	Initiative/ production	URL
D1	2017	Ávila, Asturias, Zamora	Conviviencia - Ganadería y Lobos?	Documentary produced on the initiative of a national farming about whether coexistence between wolves and farming is possible. Interviews with farmers, NGO staff, and other relevant stakeholders	UPA - Unión de Pequeños Agricultores y Ganaderos	http://ganaderiaylobos.es/
D2	2018	Zamora, Asturias The Pyrenees	Daños Cero	Interview with a shepherd in the Pyrenees who is using LGDs for wolf defence, with additional footage from Zamora and Asturias. Produced by one of the most prominent wolf protection NGOs in Spain.	Lobo Marley	https://www.youtube.com/watch?fbclid=IwAR3lu9OeS1xto7y8qQMpxHg1SIOquAF8DAHahkito9koy4QT-oGku0iOuDw&v=kR3L6-4wEsM&feature=youtu.be
D3	2018	Ávila, Asturias, Zamora	Pastando con Lobos	Episode about coexistence with wolves on 'El Escarabejo Verde': a TV programme which has been working for over 20 years in the dissemination of environmental issues. Interviews of farmers, civil servants and business associated with or impacted by the wolf.	Spanish TV 2	https://www.rtve.es/alacarta/videos/el-escarabajo-verde/escarabajo-verde-pastando-lobos/4866608/
D4	2016, 2018	Ávila, Asturias, Zamora	"Vivir con lobos", and "Coexistencia entre la ganadería extensiva y el lobo"	Interviews with farmers who are coexisting with wolves through preventative methods. Part of the campaign 'Living with Wolves' by a conservation NGO, which identified and coordinated around 60 farmers in favour of coexistence.	Foundation Ecologistas en Acción	https://www.ecologistasenaccion.org/110007/video-coexistencia-entre-la-ganaderia-extensiva-y-el-lobo/
D5	2019	National	Barabecho	Documentary about the impact of depopulation, the importance of small-scale family farms and the people who have decided to stay in the countryside, based on interviews and site visits. Produced by a national farming syndicate.	UPA - Unión de Pequeños Agricultores y Ganaderos	http://barbecho.es/

D6	2015, 2020	Zamora	El Arcón	Episodes about the influence of the wolf on the tourism sector from Sanabria (2015) and La Culebra (2020) on El Arcón, a programme on TV CyL that interviews stakeholders associated to natural, cultural and gastronomical heritage and tourism within CyL.	Castilla Y León TV channel 7	https://www.cyltv.es/programa/el-arcon
D7	2020	Zamora and Asturias	Tierra de Todos	Episode from Spain, part of an audio-visual project of more than 30 testimonies from different sectors from 17 European countries, with the aim of showing that coexistence with large European carnivores is possible. Produced by WWF as a part of an EU life project on carnivore conservation.	WWF and LIFE Euro Large Carnivores	https://www.wwf.es/nuestro_trabajo/especies_y_habitats/grandes_carnivoros_europeos/en_tierra_de_todos/
D8	n/a	La Vera	El Lince en Botas	El Lince con Botas: a documentary series on Canal Sur Extremadura, with interviews of stakeholders about the cultural, environmental and human diversity of the Extremadura community, including episodes about the last shepherds, the impact of the growing hunting sector and Tuberculosis on the traditional farming sector.	El Lince con Botas on TV channel 'Sur Extremadura'	http://libreproducciones.es/?page_id=279

Table J.3 Codebook for interview transcripts, media articles and platform communications.

Initial categories	Data-driven codes	Description	Files	References
Codes describing prominent social groups/actors within the coexistence debate				
1. Discourse coalitions	Anti-wolf		20	36
	HNVF		13	35
	Hunting		4	10
	Media		5	10
	Pro-wolf		40	93
Codes describing general view of who must adapt to whom				
2. What	People prioritised, adapt wolf governance		12	15
	Pragmatist		52	117
	Wolves roam free, people adapt		8	12
Codes describing proposed approaches				
3. How	A. Governance approaches			
	Environmental education, change attitudes		25	44
	Mediation, dialogue		29	79

Acknowledgement		40	89
Private public		2	5
Place-based, bottom-up		35	73
Proactive, adaptation		25	43
Radical sovereignty		7	15
Research		17	31
Top down, Vigilance of humans		5	8
Wolf management plan		9	13
B. Zoning approaches			
Dynamic zoning		27	69
Tourism		4	4
Fence in wolves		8	14
Restrict people and livestock		4	8
Restrict wolves, NIMBY		13	20
C. Livestock protection approaches			
Commons, collaboration		8	20
Improve habitat/alternative prey		6	6
Infrastructure, practical support		37	83

	New technology		7	9
	Prevention measures: dogs fences, night-time enclosure		41	80
	D. Responsibility			
	Farmers, through CAP		7	10
	Public		13	18
	Traditional methods panacea, modernisation		23	38
	E. Wolf control approaches			
	Control and hunting		33	68
	Control by government		30	58
	Non-lethal, protected		9	17
	F. Economic Instruments			
	Compensation		24	33
	Ex-ante		19	32
	Services		22	53
	Certification, distinction, fair prices		26	66
	Elements used to justify the “how”			

4. Why	Coexistence is...		
	Impossible	15	30
	Possible	20	37
	Farmers, hunters	4	7
	Ethical considerations		
	Concern for livestock	5	5
	Concern for wolves	7	8
	Good vs bad predators	5	7
	Human-nature perceptions		
	Humans are a part of nature	8	16
	Humans are separate, rewild, step back	8	13
	Perceptions about hunting		
	Brings economic income, prevent costs	14	18
	Increases acceptance	16	33
	Negative	15	29
	Regulating nature and populations		

Human control brings balance		19	24
Maintain wolf respect/fear of humans		14	23
Wolves regulate themselves		4	7
Wolf tourism			
Mixed		3	5
Solution		21	58
Unviable or harmful		5	6
Wolf ontologies			
Causes of livestock attacks:			
All wolves, counter narrative		6	8
Disrupted pack and vagrants		13	21
Game impacts:			
Decimate stocks		5	11
Hunting dogs		1	1
Improve stocks		5	5
Impact on ecosystem:			
Key ecological role, ecosystem engineer		27	37

Limited ecological role		11	13
Impact on farming		0	0
Contributed to farming decline		11	17
Impact exaggerated		4	4
Prey preference:			
Dependence on livestock		9	13
Easy prey: opportunist, livestock		12	14
Kill for fun, too many		5	5
Wild prey		1	1
Wildlife as property		4	6
Wolf conservation status:			
No concern, resilient		28	47
Wolves as vulnerable		3	10
Wolf presence:			
Native but never allowed		7	12
Native/belongs		7	9
Released/unnatural		6	6