



HAL
open science

Collective scientific report on the sociological, cultural and ethnological aspects of the wolf's presence in France

Richard Dumez, Isabelle Arpin, Alix Hubert, Marine Legrand, Nicolas Lescureux, Vanessa Manceron, Baptiste Morizot, Coralie Mounet

► To cite this version:

Richard Dumez, Isabelle Arpin, Alix Hubert, Marine Legrand, Nicolas Lescureux, et al.. Collective scientific report on the sociological, cultural and ethnological aspects of the wolf's presence in France. [Research Report] Muséum national d'Histoire naturelle. 2017. hal-03308112

HAL Id: hal-03308112

<https://hal.science/hal-03308112v1>

Submitted on 22 Nov 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

**Collective scientific report
on the sociological, cultural
and ethnological aspects
of the wolf's presence in France**

31 March 2017



Composition of the ESCO Wolf SHS Committee

Richard Dumez (Coordinator of the Committee), Isabelle Arpin, Nicolas Lescureux, Vanessa Manceron, Baptiste Morizot, Coralie Mounet.

Report drafted by

Marine Legrand (Project Manager ESCO Wolf SHS), Alix Hubert (Research officer ESCO Wolf SHS).

Sponsor

State Secretariat for Biodiversity for the Ministry of the Environment, Energy and the Sea.

Coordinating institution

Muséum National d'Histoire Naturelle

Translator's note

The choice has been made to keep the French acronyms – which are translated into English in the list of acronyms - in order to refer to the structures or institutions as they are in French.

Suggested citation of the report

Dumez Richard (coord.), Arpin Isabelle, Hubert Alix, Legrand Marine, Lescureux Nicolas, Manceron Vanessa, Morizot Baptiste, Mounet Coralie, 2017. Collective scientific report on the sociological, cultural and ethnological aspects of the wolf's presence in France. Report for the Ministry of the Environment, Energy and the Sea, Muséum National d'Histoire Naturelle, Paris, 67 p.

Acknowledgments

We would like to thank all the people who agreed to be interviewed in this report, the Institute of Alpine Geography which hosted the Commission during the interviewing days, and Bruno David, President of the Muséum National d'Histoire Naturelle (MNHN), and the administrative services of the MNHN for their availability and responsiveness, especially during the closure of the budget year: the secretariat of the UMR 7206 Eco-anthropology and ethnobiology budget manager of ESCO Wolf SHS (In particular Taouès Lahrem), the human resources department for accelerated recruitment procedures and financial services.

TABLE OF CONTENTS

List of acronyms.....	9
List of boxes	9
1. FRAMEWORK OF REPORT	11
1.1. Reminder of the commission.....	11
1.2. Organisation of the committee.....	11
1.3. Warning on the limits of the report's use	13
1.4. The disciplines mobilised	14
1.5. The role of Humanities and Social Sciences in addressing human-animal relationships.....	14
1.6. Definitions and concepts referred to.....	16
1.7. Presentation of the topics and plan	17
2. OUTLINE OF A GENEALOGY OF CONTROVERSIES	17
2.1. The origin of the return of wolves in France	18
2.2. Effective number of wolves.....	20
2.3. Desirable number of wolves and population regulation.....	22
2.4. Shootings	23
2.5. Impact of wolves on biodiversity.....	26
2.6. Conclusion.....	27
3. FROM THE GENEALOGY OF CONTROVERSIES TO THE DYNAMIC STUDY OF CONFLICTS: HUMANS AND ANIMALS CAUGHT IN COMPLEX SITUATIONS	27
3.1. Territorialising conflict analysis	28
The wolf as a "new scene" of tensions between pastoralism and protection of nature	28
Conflicts involving multiple spatial scales	32
Long-term conflicts affecting new territories... and persisting elsewhere	34
Discussions on the place of wolves in France which also have a symbolical importance	36
3.2. The construction of knowledge as a real dimension of conflict.....	38
The role of scientific and technical expertise	39
The number of wolves, a figure at the heart of the relationship between the construction of expertise and the administrative response of the State.....	39
A problem of coordination between field experience and scientific research: the case of herd	

protection	40
4. HOW TO DIALOGUE TO ALLEVIATE CONFLICTS WITH AND ABOUT WOLVES.....	44
4.1. Considering animals as actors.....	45
Social Science and Behaviour	46
Reciprocal learning and limiting confrontations.....	46
Diverting wolves from flocks	47
4.2. Identifying conflictuality thresholds	49
Violence revealing deep tensions	49
The productivity of conflict and the shift to violence	49
From the search for consensus to the way in which disagreements are expressed	51
Debates also concerning the terms of the relationship	52
5. RECOMMENDATIONS.....	54
Reflect collectively on the future of rural territories	54
Understand the plurality of contexts and situations.....	54
Acquire and develop knowledge and know-how through observation and experimentation	54
Improve transparency and the communication of information and data.....	56
Promote mediation.....	57
Facilitate the anticipation of the return of wolves.....	57
6. SUMMARY OF THE REPORT	59
BIBLIOGRAPHY.....	Erreur ! Signet non défini.
APPENDIX – Engagement letter of the sociological part of ESCO Wolf, 20/10/2016	77

List of acronyms

- APN – Association(s) de protection de la nature - *Nature conservation association(s)*.
- CERPAM – Centre d'études et de réalisations pastorales Alpes Méditerranée- *Centre for Studies and Pastoral Activities in the region Alps-Mediterranean*
- CNIL – Commission Nationale de l'Informatique et des Libertés - *French National Agency regulating Data Protection*
- CNRS – Centre national de la recherche scientifique - *National Center for Scientific Research*
- DDAF – Direction départementale de l'Agriculture et de la Forêt - *Departmental Directorate for Agriculture and Forests*
- ESCO – Expertise scientifique collective – *Collective Scientific report*
- FNC – Fédération Nationale des Chasseurs - *French National Hunters' Federation*
- FNE – France Nature Environnement.
- IRSTEA – Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture – *National Research Institute of Science and Technology for Environment and Agriculture.*
- MAE – Mesures agro-environnementales, dans le cadre de la Politique agricole commune (PAC) de l'Union Européenne - *Agri-environment measure in the EU's common agricultural policy (CAP)*
- MEEM – Ministère de l'Environnement, de l'Énergie et de la Mer - *Ministry of the Environment, Energy and the Sea.*
- MNHN – Muséum national d'Histoire naturelle – *National Museum of Natural History*
- ONCFS – Office national de la Chasse et de la Faune sauvage - *National Hunting and Wildlife Agency*
- OPA – Organisation(s) professionnelle(s) agricole(s) - *Agricultural organization(s)*
- PAC – Politique agricole commune - *Common Agricultural Policy (CAP)*
- PNM – Parc national du Mercantour - *Mercantour National Park*
- PNR – Parc naturel régional - *Regional Nature Park*
- SEB – Secrétariat d'État à la Biodiversité - *State Secretariat for Biodiversity*
- SHS – Sciences humaines et sociales - *Humanities and Social Sciences*
- UICN – Union Internationale pour la Conservation de la Nature - *International Union for Conservation of Nature*
- UMR – Unité mixte de recherché - *Joint Research Unit*
- WWF – World Wide Fund for Nature (Fonds mondial pour la nature).

List of boxes

- Box 1 - Legal status of the grey wolf (*Canis lupus*) in France.
- Box 2 - Introduction, reintroduction, (re) introduction.
- Box 3 - The "active" protection of flocks: shooting.
- Box 4 - Protection dogs.
- Box 5 - Examples of local mediation.
- Box 6 - The problematic polysemy of the term negotiation.

1. FRAMEWORK OF REPORT

1.1. Reminder of the commission

The State Secretariat for Biodiversity (SEB), in agreement with the Ministry of the Environment, Energy and the Sea (MEEM), commissioned in 2016 two successive complementary experiments in the face of the controversies arising from the measures "the government has put in place (...) to support livestock farming and encourage pastoralism, which are confronted with the predation of herds by the species" and in the face of the conflicts generated by the presence of wolves (engagement letter of the sociological part of ESCO Wolf, 20/10/2016, attached).

The first is a collective scientific appraisal on the future of the wolf population in France, hereinafter ESCO Wolf Bio. The report was delivered in February 2017: *Prospective assessment for 2025/2030 and long-term viability*.

The second, the subject of this report, is the collective survey in human and social sciences on the sociological, cultural and ethnological aspects of the wolf's presence in France, hereinafter ESCO Wolf SHS. It was entrusted to the Muséum National d'Histoire Naturelle (MNHN) by an engagement letter from the SEB dated 20 October 2016 and has been carried out by a restricted committee of six researchers who worked with the support of a project manager and a study officer (detailed composition below).

The committee focused on producing a review of existing knowledge on contemporary human-wolf relationships in France, as well as an analysis of the positions and representations of the actors concerned. The French situation was, as far as possible, put into perspective with examples from abroad. These elements support the lines of recommendation presented at the end of this report.

1.2. Organisation of the committee

Composition of the committee

- Richard Dumez (coordinator of the committee), ethnoecologist, Associate Professor, MNHN, UMR 7206 Eco-anthropology and ethnobiology. *Area of expertise: nature-society relations in the context of nature conservation (role and place of local populations, confrontations of knowledge, etc.).*
- Isabelle Arpin, sociologist, at the Irstea centre in Grenoble, "Development of mountain territories" Research unit. *Area of expertise: wildlife relations; modern ways of investigating and managing nature; Interface between knowledge and action.*
- Nicolas Lescureux, ethnoecologist, CNRS researcher, UMR 5175 Centre for Functional and Evolutionary Ecology (CEFE). *Area of expertise: human-wildlife relationships; local ecological and ethnological knowledge; study of the discourses and practices of conservation biology.*
- Vanessa Manceron, anthropologist, CNRS researcher, UMR 7186 Laboratory of ethnology and comparative sociology (LESC). *Area of expertise: Anthropology of nature; human-animal relationships; Social and environmental conflicts.*
- Baptiste Morizot, Philosopher, associate Professor, University of Aix-Marseille, UMR 7304 Centre of epistemology and comparative ergology (CEPERC). *Area of expertise: Environmental Philosophy and Ethics; Philosophy of ethology; Relationships between humans and large predators.*

- Coralie Mounet, geographer, CNRS Researcher, UMR 5194 Public Policy, Political Action, Territories (PACTE). *Area of expertise: Geography of the environment; Human relationships and wildlife; Human territories and animal spatialities.*

The committee has benefited from the valuable support of:

- Marine Legrand, environmental anthropologist, Project manager ESCO Wolf SHS, post-doctoral student UMR 7206 Eco-anthropology and ethnobiology.
- Alix Hubert, anthropologist, Researcher officer ESCO Wolf SHS, under contractual status within the UMR 7206 Eco-anthropology and ethnobiology - PhD in progress at the University of Liège.

Calendar and functioning of the committee

Following the engagement letter sent by the SEB to the MNHN in October 2016, steps were taken to compose and then to assemble the assessment committee. In view of the particularly busy agendas of all its members, the first meeting was held on 16 December 2016, truly launching the work of the committee. The recruitment of Ms Legrand as a post-doctoral fellow from December 1st enabled the initiation of bibliographic research. Mrs. Alix Hubert came to reinforce the team as a research officer from 20/02/17. After a first phase of compilation and synthesis of the literature, the need to conduct interviews was confirmed. These interviews were organized and conducted at the beginning of March 2017.

The committee met formally during four one-day work sessions at the Jardin des Plantes (MNHN) site:

- 16/12/16: rapid presentation of the ESCO Wolf SHS - Round table - Functioning of the committee - Discussion on the structure of the report and the organization of the committee - Discussion on the advisability of conducting interviews.
- 30/01/17: budgetary aspect - Calendar update (including the date of restitution) - Presentation and signature of the engagement letter of the members of the Committee (explanation of potential conflicts of interest, confidentiality of exchanges within the committee) - Presentation of the detailed plan and content - Calendar for drafting and proofreading - Interviews (2 days of interviews and a list of resource persons to contact have been agreed on).
- 20/02/17: preparation of questions for the interviews - Work on the detailed plan of the report and its contents.
- The 03 and 04/03/17: interviews at the Institute of Alpine Geography (Grenoble),
- In March: additional interviews (by telephone)
- 21/03/17: draft recommendations for the report.

State of the Art

The bibliographic synthesis was based on the literature available in English and French. Researches in the biological sciences have been taken into account because of the necessarily interdisciplinary dimension of the reflection. The reports produced by parliamentary inquiries, the wolf plans, LIFE, the ESCO Wolf BIO programmes and by working groups of the prospective approach were also consulted. The integration of these different approaches needs to be continued (see § 5. Recommendations).

Interviews

The Committee conducted interviews during two days in Grenoble on March 3 and 4, at the Institute of Alpine Geography, as it was convinced of the necessity to carry out its work in the vicinity of territories very directly concerned by the return of wolves. The informants unavailable during these days were interviewed by telephone.

The Committee had previously sent eight questions to the persons interviewed so that they could prepare their replies. They were asked, on the basis of their involvement and personal experience, to indicate:

1. What are the main questions raised by the return of wolves to France? Do some of them seem to have been neglected or on the contrary, exaggerated?
2. How do you perceive the evolution of relations between the people concerned and the wolves?
3. How do you perceive the evolution of relationships within stakeholder groups including the State and its representatives, and between these groups?
4. What role has the legal context played in the evolution of these relationships (questions 2 and 3)?
5. What positive or negative elements have disagreements (discussions, concrete situations) been able to raise? Under what conditions?
6. Considering what has been done so far, do you think it necessary to acquire new theoretical and practical knowledge? If so, on what? Which actors should contribute to their production, with which respective roles?
7. Do you think it necessary to carry out experiments? On what subjects, with whom, and under what conditions?
8. What objective(s) do you think should be targeted concerning the relationship between humans and wolves in France? How should this be managed.

Eleven people were interviewed. Interviews are confidential data internal to the work of the committee and cannot be disseminated; no interlocutor is specifically mentioned in this report. The diversity of interviewees enabled different points of view to be taken into account: breeders, shepherds, hunters, sheep breeders' representatives, local authority officials, members of a conservation association, agents of the Ministry of the Environment, researchers involved in the study of pastoralism in the context of predation and the experimentation of means of protection. The data from the interviews are referenced by the quotation: (interviews).

1.3. Warning on the limits of the report's use

The committee conducted its work within a very short timeframe to respond to a particularly complex mission due to the societal issues raised by the return of wolves to France and the extent of the information to be processed. Although aware of the importance of conducting interviews, it had to limit them to eleven, while ensuring that they selected a panel of actors as diverse as possible; this small number certainly diminishes their scope, but the rich content of their testimonies confirms their validity. These interviews helped to supplement the data from the literature on the basis of the experience of the persons interviewed and their precise knowledge of the subject, very close to the field and revealing the diversity of points of view.

The report must therefore be read in the light of this temporal constraint which has prohibited full exploration of all the issues addressed. In spite of this limiting factor, the committee has attempted to respond to a commission which deserves and requires ways to be found in order to pursue its work in greater depth. This is one of the recommendations of the committee.

1.4. The disciplines mobilised

The main disciplines involved are sociology, anthropology, ethnoecology, geography and philosophy. Secondly, we used the results of studies carried out in history, psychology and political science. Economy, agronomy and the law could not be referred to being too far from the committee's sphere of competence.

Specificities of the approach

The disciplines mobilized have in common to tackle their questionings according to a holistic, inductive and qualitative approach:

- The holistic approach focuses on how the different elements of a system are interrelated and differs from a reductionist approach isolating elements of a problem to analyse them one by one,
- The inductive approach constructs its hypotheses on the basis of field observations and data collected, in a complementary way to a hypothetico-deductive approach for which the empirical data serve to validate or invalidate a hypothesis established beforehand (Passeron, 1991; Olivier de Sardan, 1995)
- The qualitative approach is based on methods such as participatory observation, interviews, questionnaires and archival processing, producing data that is then subjected to a textual analysis - unlike a quantitative approach based on numerical data analysed statistically (Olivier de Sardan, 2008; Kirk & Miller, 1986).

1.5. The role of Humanities and Social Sciences in addressing human-animal relationships

The existence of conflicting relationships between humans and animals is a widespread phenomenon that does not only concern, far from it, large carnivores. Involving both competition for the same resources as predation, conflicts are complex and give rise to a variety of responses, both materially and symbolically (Knight, 2000).

Conflicts surrounding nature conservation programs need to be approached from an interdisciplinary perspective, involving academic research, social dialogue and knowledge exchange, taking into account their long-term dynamics (Redpath *et al.*, 2013). Conflicts involving large carnivores are of particular importance here, linked to the place of these animals in ecosystems, the diversity of socio-ecological contexts in which conservation programs take place, and the intensity of conflicts surrounding them. In this regard, Linnell and his colleagues, on the conservation of the most widespread carnivores in Europe, such as wolves, bears and lynxes, stress the importance of leaving room for the development of a variety of scientific approaches (Linnell *et al.*, 2005).

The history of relationships between humans and wolves probably dates back several hundred thousand years. The proximity between these two species led to the first known domestication, that of the dog, about 16 000 years ago (Larson *et al.*, 2012). It is likely that the often conflicting nature of human-wolf relationships

is a consequence of the domestication of ungulates about 11 500 years ago (Zeder, 2011, Lescureux & Linnell, 2014). At the present time, in a context of increasing anthropization of habitats, wolves and humans often share the same areas over much of the northern hemisphere (Fritts *et al.*, 2003), and several ecological studies have shown that wolves adapted their behaviour to the presence and activities of humans (Ciucci *et al.*, 1997, Theuerkauf *et al.*, 2003, Theuerkauf, 2009).

The influence of wolves on human societies is far from negligible. Their impact on hunting activities is still little studied. On the other hand, their material impact on animal husbandry is attested from antiquity. It has been the subject of publications in the field of pastoral studies (Garde, 2007, Vincent, 2007, Meuret, 2010) and also - abroad - in the field of *Human Dimensions of Wildlife*, see for example Stogen, 2015). A sensitive subject, wolf attacks on humans are brought to the fore internationally by biologists (Linnell *et al.*, 2002). In France, they have been the subject of extensive research in rural history, which has revealed the recurrence of the phenomenon over the course of history (Moriceau, 2007, 2010, 2011, 2013, 2016). While these attacks relate to a small number of casualties during the historical period, they are not limited to cases of attacks by enraged wolves. The social sciences, on the other hand, have been particularly interested in the social and symbolic dimensions of wolves, which are particularly rich. On the one hand, wolves are omnipresent in the mythologies of the northern hemisphere (Lopez, 1978) and on the other, they rarely leave indifferent the social actors who are confronted with them (Mauz, 2005; 2011). Their presence in myths is marked by an ambivalence: a devouring animal associated with nothingness (in Scandinavia) or the devil (for medieval Christian Europe), but also a protector and ancestor for the Altaic and Roman peoples (Lescureux, 2010).

The involvement of the social sciences in the field of human relations and wolves takes on a particular importance because of the protection status enjoyed by the wolf in Europe (see Box 1 - Legal status of the grey wolf (*Canis lupus*) in France). Biodiversity is considered a heritage of humanity (Convention on Biological Diversity, 1992) and the current crisis of extinction calls for work on the links between natural diversity and cultural diversity and on the different types of knowledge involved in comprehending and preserving it (scientific, technical, local knowledge). Conservation also needs to be studied as a social phenomenon, paying attention to how the actions taken by conservationists interact with those of the local populations concerned (Dumez *et al.*, 2014, Sourdril & Welch-Devine, 2014). It is also a matter for the social sciences to engage in the study of the relations between humans and animals by going beyond the simple juxtaposition between biological and social studies. This is based

Box 1 - Legal status of the grey wolf (*Canis lupus*) in France

Species of community interest covered by the Directive Habitats Faune Flore (DHFF) 92/43 / EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. The species is present:

- In Annex II of the Directive, which requires Member States to designate habitats for the species in sites of community importance and included in the Natura 2000 network,
- In Annex IV, which obliges Member States to adopt a strict protection regime throughout its natural range within the EU, both within and outside Natura 2000 sites.

Species listed in Appendix II "strictly protected wildlife species" of the Convention on the Conservation of European Wildlife and Natural Habitats, known as the Berne Convention (1979).

Species belonging to the list of protected mammal species on French territory (current Ministerial Decree of 23 April 2007).

Species covered by the Decree of 27 May 2009 amending the Decree of 9 July 1999 establishing the list of protected vertebrate species threatened with extinction in France and whose range extends beyond the territory of a department.

Species under the regulatory part of the Environmental Code (Articles R. 411-8 and R. 411-13), and interministerial decrees describing the conditions under which exemptions to protected status may be granted by prefects.

*Information taken from the ESCO Wolf Bio report, Collective scientific assessment of the long-term viability and fate of the wolf population in France (Duchamp *et al.*, 2017, pp. 16 and 18).*

on the idea of a separation between nature and culture, which can no longer be considered universal today (Descola, 2005). Returning to the dissociation between biological and social studies, ethno-ethology is concerned with the ability of animals to influence human practices, knowledge, know-how and visions of the world. This capacity is revealed in the narrative of those who live in contact with animals in a continuous and prolonged way. Understanding the reciprocal influences between humans and animals requires attention to the diversity of knowledge, taking into account the particular ecological and social contexts in which they are built and transformed (Ingold, 2000, Brunois *et al.*, 2006, Lescureux, 2010). From a similar point of view, some geographers are interested in the "effects of places" in the relations that human populations maintain with large fauna. Territorialized approaches have notably highlighted the role of protected areas but also hunting plans in the increasing conflicts caused by the increase in numbers and the extension of the ranges of large wild fauna (Mounet, 2006a, Poinsot, 2008).

Addressing the conflicts surrounding the return of wolves in France implies analysing the dynamics of reciprocal adaptations between actors, including wolves, in situations that are always singular. Focusing on these adaptive dynamics allows us to identify the types of situations in which conflict is taking place and where it can be avoided or mitigated. These dynamics depend in particular on the knowledge and know-how developed by the human actors involved. Their study therefore relies on the collection and sharing of scientific and local knowledge in order to establish a well-argued, transversal knowledge about human-animal relations inscribed within particular territories.

1.6. Definitions and concepts referred to

Actors: the term applies here to "humans" and "non-humans" and thus includes, for example, breeders and shepherds, scientists specialized in wolves or pastoralism, domestic animals, wolves, protection of predators or promotion of pastoralism associations, infrastructure, landscape etc.

Conflict: it is a relational form in its own right which does not necessarily constitute a dysfunction and can generate positive social transformations (Simmel, 1992 [1908]). Conflict can prove to be productive to a certain extent, when, by highlighting power relationships, it makes it possible to reveal the acceptable terms of cohabitation or coexistence between differentiated, hierarchized social groups under pressure and depending on one another. It then allows the renewal of social relations and avoids their rupture. It becomes deleterious in the opposite case, especially if it becomes violent. Being always more or less a source of suffering and destruction, the question arises as to under what conditions it can also be socially productive.

Sociotechnical controversy: the study by sociologists of the "sciences in the making" from the 1980s showed that the production of scientific knowledge and technological developments are not only a matter of conflicting rationalities, they also involve many stages of negotiation and have a polemical dimension (Callon, 2006 [1981]). The notion of sociotechnical controversy is elaborated in a context in which the risks and uncertainties surrounding technological developments provoke debates and social protests. Sociotechnical controversies involving academic actors and other societal actors, through the expression of disagreements and their always temporary resolutions, contribute to the orientation of scientific and technical activity (Callon *et al.*, 2001).

Mediator: The mediator, in the context of this report, is to be understood as a person - or institution - which offers a local and specific translation of the problem posed by the presence of wolves, enabling the actors to be involved in a collective formed around this definition. The term translation is understood here, in the broad sense, as a transmission with transformation (Akrich *et al.*, 2006).

Local knowledge: the expression "local knowledge" refers to a set of knowledge and know-how related to a particular socio-ecological context. Through the accumulation of everyday experiences, a detailed

knowledge of the social and ecological environment is developed, knowledge organized in a contextualized and situated knowledge system.

Territory: the concept of territory has several definitions. It first designates the frameworks of public action and political representation for local government. The territorialisation of public action increasingly involves many local actors in consultation procedures (Blondiaux & Sintomer, 2002). The territory, in a less institutional sense, also gathers forms of appropriation of space by individuals and social groups, the ways by which they shape the space in which they live by material and symbolic practices (Alphandéry & Bergues, 2004; Vanier, 2009). Finally, a territorial approach to this problem cannot exist without an integration of the modes of occupation of space by non-human actors, even if the notion of territory is apt to be contested in the ecology of the populations.

1.7. Presentation of the topics and plan

We propose a transversal reading of the conflicts surrounding the return of wolves in France in three stages. The first (§ 2) revisits the main controversies that have followed one another since this time. The goal is to show, by making their genealogy, that these are not independent of each other but succeed one another and nourish one another. The second step (§3) proposes to re-establish the tensions between pastoral breeding and protection of wolves in a wider reality by considering that they concern a series of social, animal and environmental actors involved in territorial dynamics in constant reconstruction (§ 3.1) and that the construction of knowledge is an integral dimension of conflicts (§ 3.2). The third section (§ 4.) explores the theoretical and practical resources available and developed to support the avoidance of violent confrontations in commonly frequented spaces from two angles: the influence exerted on the behaviour of wolves by considering them as part of a relational group (§ 4.1) and the forms of local social arrangements that can limit the intensity of conflicts and promote their social productivity (§ 4.2).

2. OUTLINE OF A GENEALOGY OF CONTROVERSIES

In this section we return to the main controversies that have occurred in France since the return of the wolves in the early 1990s. In describing the temporal and spatial scales of these controversies, presenting the stakeholders and their respective arguments and emphasizing the links that are established between these controversies and other debates existing or past, we wish to highlight the way in which these feed on each other.

We return to 5 controversies in particular:

- The origin of the return of wolves to France, which has been the subject of controversy since the early 1990s between the stakeholders who affirm its natural origin and those who suspect reintroductions.
- The effective number of wolves present on French territory; the official estimates of the ONCFS are received with suspicion both by the OPA and the APN.
- The desirable number of wolves and the regulation of populations; The relevance of a mostly demographic approach and that of active population management are at the heart of the debate.
- The shootings; discussions between stakeholders focus on the purpose of shooting (regulating populations or protecting flocks), their effectiveness and the conditions under which they are to be carried out.

- The impact of wolves on biodiversity; Those who see the wolf as the guarantor of the naturalness of the environments are opposed to those who see in him the disturber of an agro-pastoral activity beneficial for the environment.

2.1. The origin of the return of wolves in France

Temporality

1987 - Slaughter of a wolf in Fontan (PNM). Conclusion of the autopsy report: wolf escaped from a livestock farm located on the Italian border and recently closed.

1992 - First wolves observed in the PNM, information released several months after the field observations.

April 1993 - Formalization of the return of the wolves by *Terre sauvage*, before the Ministry of the Environment.

A few months later - First attributions of attacks on domestic herds to wolves - Amplification of the controversy.

Mid-1990s - Intensification of attacks on domestic livestock herds - Investigations on the origin of the return of wolves launched in parallel by the Ministries of the Environment and of Agriculture.

1996 - The wolves of the Mercantour come from the Italian populations: affirmation of the director of the Direction of Nature and Landscapes (Ministry of the Environment).

Decree of 19 May 2000 - Detention of wolves subject to authorization and obligation to identify wolves held in captivity by an individual and permanent marking.

2003 - Report of the commission of inquiry on the conditions of the presence of wolves in France and the practice of pastoralism in mountain areas (Estrosi & Spagnou, 2003).

Actors and arguments

In 1992, the first observations of wolves were kept secret by the PNM and the State until their natural origin was established. The news was published by the magazine *Terre Sauvage* in April 1993. This initial silence, following the case of the wolf of Fontan, contributed to launching the controversy and instilled doubt on the role of public authorities in the return of wolves in France.

For the APN, all the conditions for a natural return of wolves in France were present: presence at the Italian border since the 1980s, abandonment of agriculture, extension of forests, abundance of game, protection status for the wolf, migration and colonization capacities of the animal (Mounet, 2007). In 1987, the APN refuted the official conclusion on the Fontan wolf. The natural return from Italy is supported by scientists specialized in wildlife (Skogen *et al.*, 2006). The French administration supports its official position on their expertise. Researchers in biological sciences nevertheless acknowledge that this return may be accompanied by occasional clandestine releases without having any proof (Mounet, 2007).

The motive of (re)introductions (see Box 2 - Introduction, reintroduction, (re)introduction; below) is persistent in conflicts around large fauna (Mauz, 2006a). The return of the wolves would provide a new avatar, the reintroductions of other carnivores in France, released officially, thus explicit and visible, like the bear, nurturing the controversy about the origin of wolves in France. The fact that the strict protection of

the animal by the European legal system is conditioned by its *natural* return probably plays a part in the acuteness of the (re) introduction controversy: the wolf would thus fall outside the protection measures resulting from the Berne Convention and the Habitats Directive.

Some sheep farmers and part of the local population suspect illegal (re)introductions by extremist environmentalists having acted alone or (ii) supported by management bodies. (i)

Illegal releases actually took place in the 1960s (Campion-Vincent, 2000) and in the 1980s some APN

Box 2 - Introduction, reintroduction, (re) introduction

The concepts of reintroduction and introduction are defined by the International Union for Conservation of Nature (IUCN) in its *reintroduction guidelines* of 1998 (IUCN, 1998) on one part, and on the other, in its *guidelines on re-introductions and other safeguarding transfers* in 2012 (IUCN, 2012). In this second document, IUCN defines the following:

Reintroduction is an "intentional displacement of an organism to release it in a site in its original distribution area from which it has disappeared. Reintroduction aims to restore a viable population of the target species within its original distributional range"(IUCN, 2012),

The introduction for safeguard purposes is an "intentional displacement of an organism to release it in a site outside its original distributional range".

IUCN distinguishes two forms of introduction for safeguarding purposes:

Assisted colonisation refers to "the intentional displacement of an organism to release it in a site outside its original distributional range to prevent extinction of the target species",

Ecological replacement refers to "the intentional displacement of an organism to release it in a site outside its original distributional range to ensure a specific ecological function" (IUCN, 2012).

While the distinction between these two forms of introduction is *a priori* very clear, it is not unanimous in practice. Some believe that this distinction is imperative, in particular that the managers and protectors of nature for whom releasing an animal in an environment of which it is absent is justified only if the objective pursued is the restoration of this environment. This perception is based on a very different relationship to nature than that of introducers, who consider this distinction superfluous. The latter see in the release of an animal in an environment a way of enriching and improving it (Mauz, 2006a). Moreover, it frequently happens that the actors use both terms indiscriminately to speak of the same event. In this context, many authors use the formula (re) introduction (Bobbé, 2004, Mauz, 2006a, Maurice, 2013).

The reason for the (re) introduction was mentioned in particular by the sheep farmers and the local populations at the time of the return of the wolves in France and resonates with the questions about the good place of this animal on the French territory.

In this report, the concepts of introduction and reintroduction are used in relation to the definitions proposed by IUCN.

publicly stated their reintroduction objective; the wolf of Fontan affair nourished the distrust of them. These facts add to the rumours of clandestine releases, the persistence of which can be explained by a confrontation between divergent social logics (see the case of the releases of the viper examined by Elisabeth Rémy (1993)). (ii) The reintroduction of protected species in the Alps, in particular by the PNM (ibex 1987, 1995, 2005-2006, bearded vulture (lammergeier) between 1993 and 2015, www.mercantour.eu), contribute to a climate of suspicion as to a possible identical action with the wolf (Larrère, 2014). The secret implementation of former informal reintroduction programmes by the Ministry of Ecology (Mounet, 2007, Skogen et al., 2006) is also suspected. Testimonies about the activities and behaviour of wolves deemed suspect or "non-natural" (lack of fear of man, non-consumption of the ewes attacked) reinforce the argumentation on reintroduction. The extent of the controversy led to a parliamentary inquiry (Estrosi & Spagnou, 2003). It led to the conclusion of the absence of organized reintroduction of wolves in France and the fact that the ecological conditions are sufficient to explain their return.

Spatial scale

The controversy appeared in the hinterland of Nice (in and around the PNM) and then quickly spread to all the Alps before spreading to the rest of the French territory, conveyed by professional agricultural associations and by certain national elected representatives following the expansion of numbers of wolves (Larrère, 2014).

Mobility and permeability of controversies

Some actors continue to challenge the natural origin of the return of wolves in the territories they have colonized since the 1990s and more often in the newly colonized territories. It can reveal the desire to find an external origin to the misfortune (as in designating several species of birds as being responsible for the arrival of the avian flu in Dombes, Manceron, 2009, 2014). This controversy, however, has lost the central character it initially had, by virtue of its cognitive productivity: it enjoined the actors to produce enough solid knowledge to reduce the credibility of the arguments linked to uncertainties (Mounet, 2007). While it is impossible to exclude the possibility of occasional releases, it is now well established that the wolves that colonized the Alps are of Italian stock, and that the conditions of their permanent settlement are derived from the transformation of rural territories, first and foremost the abandonment of agriculture. Nevertheless, the return of the wolves restarts debates or exacerbates existing or past conflicts:

- Difficult situation of French agriculture and *a fortiori* of a part of sheep farming, during the return of the wolf, situation nuanced or even challenged by people interviewed who consider instead that today sheep farming is rather experiencing a favourable phase,
- Role of pastoralism in the maintenance of natural areas,
- Appropriation and use of rural territories (e.g. conflicts related to the creation of protected areas),
- Place of large carnivore predators (wolves, bears, lynx) in the mountain areas (Lescureux & Linnell, 2010b)
- Role played by stray dogs,
- Protection status of wolves - arguing that their presence is the result of illegal activities is a legal means of obtaining their elimination; on the other hand, maintaining that it is of natural origin is a means of obtaining strict protection (Mauz, 2005).

2.2. Effective number of wolves

Temporality

1993 - Launch of the scientific monitoring programme of the Wolf by the PNM (collection of signs of presence).

1996 - ONCFS in charge of the harmonized monitoring of the wolf population in France.

1990s - Development of genetic methods (Grenoble Alpine Ecology Laboratory, LECA) to certify the presence of the species via the DNA found in the collected material indicators (hair, excrement); Development of methods for the individual identification of each wolf, based on the methods used to estimate the number of wolves used for the first time in 2004.

Until the years 2000 - Little interest in the number of wolves present in France (Doré, 2011). The only indicator developed was the so-called "minimum accepted population", which is measured only in areas where the species is sedentary.

2003 - Reaffirmation of a direct management of the species following the *Life-Wolf 2* programme and the need to use numbers and growth to define an appropriate level of harvesting.

Today - Challenges to the number policy and its management by the ONCFS - Problems of feedback from the national network of observers.

Actors and arguments

The ONCFS, in charge since 1996 of the measurement of the number of packs, the geographical area of presence and the estimation of the population of wolves in France and its evolution over time, relies on the gathering of evidence of the presence of the animal by members of the Wolf Network¹

Since 2003, the question of the number of wolves reinforces the antagonism between actors with divergent interests (Doré, 2011). Representatives of OPAs are somewhat suspicious of figures deemed imprecise and controversial because of the difficulty of counting the wolves and the different results obtained depending on the method of counting used: winter follow-up, howling caused (Not used by ONCFS to provide estimates of total numbers), capture-tagging-recapture (a recognized method for monitoring wildlife populations). Some of these representatives, depending on their interests, interpret the figures announced by the ONCFS upwards to promote an increase in shooting quotas, while some breeders consider that the number of wolves is not the most important factor- whether they are present or absent in given spaces on one hand, and the frequency and importance of predation on the other hand, being perceived as far more central (Mauz & Granjou, 2007; Mounet, 2007).

APN representatives are also distrustful of the figures produced by the ONCFS, the latter being interpreted downwards to encourage a low harvesting rate of wolves (Doré, 2011). Naturalists question the independence and neutrality of the ONCFS, associating this administration with the world of hunting. The Office is sometimes locally associated with other actors to the naturalist world (Benhammou & Salvador, 2003).

Faced with these suspicions and the manipulation of figures, the ONCFS has constantly sought to improve the scientific nature of the data produced by working closely with academic research laboratories (geneticists, biomathematicians) so that they can be considered as devoid of any partisan considerations (Doré, 2015, Granjou & Mauz, 2009a, Mauz & Granjou, 2007). In 2016, the correspondents of the Loup-Lynx network decided not to pass on their information, for reasons that appear varied. On the one hand, an important responsibility weighs on the expertise because it is taken into account in the process of negotiating slaughter quotas, a responsibility not necessarily endorsed by naturalists on the field participating in the counts and in disagreement with the current shooting policies. On the other hand, the retention of data on the wolf is used as a means of pressure by the ONCFS field agents *vis-à-vis* their management to obtain satisfaction on certain claims (independent of the wolf file) .

Conversely, the confidence interval that systematically accompanies the ONCFS figures (deliberately drawn up from the methodological point of view) contributes for this organization to guaranteeing the honesty and scientific rigour of the approach, and is perceived as such by the Administrations, reflecting the difficulty of the exercise. It is then up to these Administrations to consider this uncertainty in their decision-making.

Spatial Scale

The scientific monitoring of the wolf was initially carried out by the administration of the PNM. With the expansion of the wolf population in the departments of the Rhône-Alpes region and beyond, the ONCFS, through the Wolf Network, which became Wolf-Lynx Network in 2001, took this over. (Doré, 2011) .

¹ The network currently has about 1200 people (<http://www.oncfs.gouv.fr/Le-Reseau-Loup-Lynx-ru100>). By 2015, 67% of the members were from nature management structures, 16% from hunting associations, 7% from nature conservation associations, 2% from the agricultural sector for the main ones; Doré, 2015).

Mobility and permeability of controversies

- Neutrality of the ONCFS and funding of scientific research on wolves.
- Desirable number of wolves.
- Shootings and their effectiveness.

2.3. Desirable number of wolves and population regulation

Temporality

Mid-1990s - Increase in predation on domestic flocks - Emergence of public hostile to the strict protection of wolves, including professional breeders who think it illegitimate, get organised and publicly denounce the consequences on their work (Campion-Vincent 2000; Doré, 2015).

1996 - Proposal by the State of a management of wolves based on territorial zoning; Rejection of NPAs against any form of regulation during the recolonisation phase.

1999 - Idea of management with zoning taken up and then rejected by the OPA (Bobbé, 2002).

2000 - *Action plan for the preservation of pastoralism and wolves in the Alpine arc* with implementation of the zoning project advocated since 1996 (Campion-Vincent, 2000); Rejection of APN and OPA (Bobbé, 2002).

2003 - End of the *Life-Wolf 2* programme and reaffirmation of the need for direct population management.

2004 - *Action Plan on wolf 2004-2008*: a new direct management strategy based on lethal control of populations under the derogation conditions of the Berne Convention and the Habitats Directive (without zoning); Harvesting measures framed by annual ministerial decree (Definition by the policy of the number of wolves to be killed, partly on the basis of technical information (ONCFS) and a viable model of wolf populations, and partly on taking into consideration the demands of the various stakeholders - APN, OPA) (See Box 3 - "Active" protection of herds; shooting; at § 2.4.).

Today - The strategy of direct management based on lethal control, developed annually by political decision, is still current and is the subject of a new plan every four years.

Actors and arguments

The state and its representatives see in the regulation of wolf populations a means of pacifying and alleviating the tensions generated by their presence and of fighting against poaching.

Shepherds (Alpes-Maritimes) and OPA representatives criticized the strict protection of the species and its legal coherence, notably because of the inability of the sheep industry to withstand predation, the ineffectiveness of protective measures, benefits of pastoralism on biodiversity (vs uselessness of the wolf) and economic consequences (compensation, cost of harvesting). With the spread of wolf populations, most representatives of the agricultural world will gradually abandon the idea of eradication in favour of regulation.

In a first step, the APN are radically opposed to any intervention even exceptional and by derogation as long as the population of wolves is not, according to their analysis, in a favourable state of conservation. They relativize the damage inflicted on the herds and affirm the effectiveness of the protective measures. On the one hand, they question extensive pastoral practices and on the other hand insist on the role of stray dogs in predation. For them, the wolf is of intrinsic, ecological, but also aesthetic, patrimonial and ecotouristic interest (Mounet, 2007). However, the APN insist on the ambiguity of the notion of "favourable conservation status" and emphasize, first of all, that the number of wolves present on the territory is not sufficient to qualify this state since it would not be a good indicator (Mauz & Granjou, 2007). Some ecologists join them on this point and regret the focus on demographic factors (Doré, 2011). With the

development of the lupine population and the increase in predation on domestic livestock herds, some APN however recognize the limitations of herd protection solutions and are considering the removal of problematic individuals as a form of ethological selection and a means of appeasing conflicts and contributing indirectly to the conservation of the species (Doré, 2011).

Spatial scale

The controversy was first confined to the Southern Alps (1993, beginning of compensation for damage in the PNM; 1997, defensive measures within the European *Life-Wolf* programme) where the support of the local MPs to the OPA contributes to the national recognition of the situation of shepherds and breeders in the face of wolves (Bobbé, 2002). The APN also nationalize the controversy via polls, including IFOP for ASPAS and One Voice in September 2013 on the place of the wolf in France (Fagier *et al.*, 2014).

Mobility and permeability of controversies

If the controversy moves towards the question of the conditions and technical modalities of the regulation of wolf populations (Doré, 2011), it nourishes others and questions:

- Who attacks and kills? Dogs? Wolves? Hybrids between dogs and wolves?
- Conditions and technical modalities of shootings and their effectiveness,
- Extensive pastoral practices,
- Agro-environmental policies, the relationship between pastoral activities on biodiversity and the effects of the wolf's return on biodiversity (more broadly the socio-economic effects of the return of wolves),
- Impact of wolves on game populations.

2.4. Shootings

Temporality

2004 - *Action plan on the wolf 2004-2008* - New direct management strategy: harvesting measures under an annual ministerial order (number of wolves to be killed on the basis of technical information (ONCFS) and a viability model of populations), shootings allowed under certain conditions (preventing major damage to livestock, maintaining a favourable conservation status, and constituting the only satisfactory solution).

2008 - *National Wolf Action Plan 2008-2012*.

2013 - *National Wolf Action Plan 2013-2017* - Enhanced defence shooting, new herd protection tool (Audrain-Demey, 2016, Fagier *et al.*, 2014).

Decree of May 15, 2013 - Conditions and limits in which derogations to prohibitions of destruction may be granted by prefects concerning wolves.

2014 - *Law for the future of Agriculture, Food and Forestry* - Relaxation of conditions for shooting authorization: Prefects may authorize shooting by breeders during proven attacks (Vincent, 2014). The mobilization of this legal framework must nonetheless be integrated with that of the inter-ministerial decrees defining the conditions for actions implemented at the departmental level by the Prefects.

Summer 2014 - Public consultation on the draft decree for the testing of wolf harvesting shootings within the meaning of the decree of 15 May 2013.

Decree of June 30, 2015 - Facilitation of the species harvesting measurements (Audrain-Demey, 2016).

July 22, 2015 - Government support plan for French livestock breeding made public, clear will to negotiate with the European Union a declassification of the wolf as a strictly protected species (Audrain-Demey, 2016).

Actors and arguments

The word "shooting" covers a variety of modalities of action that fall within the protection of herds qualified as active (see Box 3 - "Active" protection of herds: the shootings).

Two logics emerge for the harvesting of wolves: one of regulation of the wolf populations, the other of protection of the herds. Among the representatives of the State, the former is reflected in the objectives of the successive Wolf Action Plans, while the latter is rather highlighted in the successive technical protocols decided by the State in negotiation with the stakeholders (APN, OPA, FNC) and supervised or implemented by the ONCFS (Doré, 2011).

The logic of regulation is widespread among OPAs who criticize these technical protocols, which they associate with the ONCFS, and the role of the successive Plans (ineffectiveness of the measures including harvesting shootings, too low harvesting quotas, authorization conditions too restrictive (Doré, 2011), doubting the will of management of the State). The increase of predation on livestock herds and the associated surplus labour, which is unacceptable for livestock farmers, reinforces these criticisms. While some OPA ask that breeders may carry out some harvesting shootings, all breeders do not agree on the practical arrangements for harvesting: some claim self-defence, others believe that shooting wolves is not part of their job (Grandmougin *et al.*, 2010; Mounet, 2007).

The public consultation of the summer 2014 showed the antagonisms: favourable opinion of the OPA and hunters associations, opposition of the APN. Despite a majority of opinions opposed to shooting, the decree of June 30, 2015 was adopted and transformed the experiment into a standard (Audrain-Demey, 2016, Fagier *et al.*, 2014). Beyond this consultation, all seem to agree on one principle: shootings are not part of the job of agents of the ONCFS (Doré, 2011). Hunters are ready to assume them under the control of the ONCFS, seeing in this a means to free these same agents from a time-consuming task (Mounet, 2007).

Box 3 - "Active" protection of herds: the shootings

In the early 2000s, the management of wolf populations by the elimination of certain individuals was widely advocated by researchers close to the pastoral environment (Deverre, 1999; Chabert *et al.*, 2004) and certain biologists whose primary objective is the long-term viability of the population (Mech, 1995; Mech & Boitani, 2003: 335). In France, the Wolf Action Plan 2004-2008 launched the first direct management strategy based on lethal control of populations. Since then, measures to protect herds have been detailed by the government in the successive Wolf Plans. The Decree of 15 May 2013 lays down the conditions and limits in which derogations from prohibitions of destruction may be granted by the Prefects. After having been largely relaxed by the decree of 5 August 2014, which involves experimentation for the implementation of harvesting shootings within the meaning of the decree of 15 May 2013, the decree of 30 June 2015 transforms experimentation into a standard (Audrain-Demey, 2016): "Decree of 30 June 2015 laying down the conditions and limits in which derogations from prohibitions of destruction may be granted by the prefects concerning the wolf", the prefect determining which breeders are granted these derogations.

Several types of operation are possible:

Scaring operations, including non-lethal shootings, are designed to avoid predation attempts and may be carried out on protected herds or to compensate for the absence of protective measures in order to leave them time to be implemented. These operations may be carried out by the breeders designated by the prefect, a wolf-hunting officer or a delegate subject to the holding of a valid hunting license, without prior request (except for the heart of national parks). Only rubber or metal shot ammunition is permitted.

Defence shootings may occur when herd protection measures have been implemented or the herd is recognized as unprotected. They are carried out by the beneficiary of the derogation or by any person authorized by him, subject to the holding of a valid hunting license for the current year. They concern the pasture or range he uses throughout the duration of the herd's presence in the territories subject to lupine predation outside the national nature reserves.

Strengthened defence shootings may occur when protection measures and defence fire are not sufficient to curb the damage to the herd and repeated attacks (at least 3) have taken place over the past 12 months on the herd or on neighbouring herds. These shootings concern the pasture or range used by the beneficiary of the derogation or in their immediate vicinity. The modalities for carrying out these operations are defined under the supervision of the ONCFS or a wolf-hunting officer. The operation can be carried out by any competent person subject to holding a valid hunting license for the current year. These shootings can be carried out simultaneously by several shooters whose number is fixed by the prefect after consultation with the ONCFS.

Harvesting shootings are only permitted outside national parks and national nature reserves and are suspended between 1 March and 30 April in order to respect the breeding cycle of the species. They can intervene if significant or recurring damage is observed in farms where defence shootings have been implemented and despite the installation of the protective measures. The harvestings are organized by a prefectural decree which determines the area concerned and the number of wolves that can be slaughtered. They are conducted according to the technical modalities defined by the ONCFS. Over a period of one month renewable, these operations can be implemented by any competent person subject to holding a valid hunting license for the current year. Harvesting shootings can also be conducted when beating large game and hunting when approaching or hunting for big game. In some cases, reinforced harvesting shootings may be used.

The logic of herd protection dominates within the APN - protection measures used by herders and shepherds. Some APN accept the idea of defence shootings if they take place around herds that are also protected by other means and if the wolves are responsible for damage (Mounet, 2007). Harvesting shootings are more difficult to accept (doubts about the usefulness in the prevention of attacks) because they are essentially carried out temporally outside the presence of the herds on the field. Applying harvesting measures on the new fronts is considered inadequate (Fagier *et al.*, 2014; Lefebvre & Monnier, 2012), being

in contradiction with the international texts. The APN emphasize that shooting (harvesting and defence) does not reduce poaching (Doré, 2011, Fagier *et al.*, 2014).

Spatial scale

If the Alpine arc cattle farmers have had to adapt to the presence of wolves, their colleagues in the new colonization fronts still think it possible to avoid them and hold more radical positions. The different postures and the various arguments used evolve according to the geographical progression of the wolves (Mauz, 2005; Mounet, 2007).

Mobility and permeability of controversies

- Effective number of wolves.
- Necessity and relevance of population regulation.
- Agro-environmental policies and the impact of pastoral activities on biodiversity.
- Who attacks and kills? Dogs? Wolves? Hybrids of dogs and wolves?
- Effects of the wolf's return on biodiversity - Negative impact of herd protection measures.
- Socio-economic effects of the return of wolves.
- Effects of shooting on the behaviour of packs.

2.5. Impact of wolves on biodiversity

Temporality

Since the 1980s - In the Southern Alps, a policy of redeploying pastoral activities with recognition of the role of breeders in the maintenance of landscapes and the maintenance of biodiversity (Garde *et al.*, 2014).

1992 - Return of the wolf in the alpine massif and questioning of the role of sheep pastoralism in the maintenance of landscapes and the maintenance of biodiversity (Vincent, 2010).

Actors and arguments

Two points of view, and two groups of actors are opposed. According to the first, which brings together some scientists and OPA and hunting world representatives, the wolf is the disruptive element of a quality relationship between human activities and the environment. The main argument is the positive impact of agro-pastoral activities on natural environments and biodiversity. From this point of view, by threatening pastoralism, it is the biodiversity that the wolf would endanger (Chandelier *et al.*, 2016, Vincent, 2010). Protection measures for herds would also have negative effects on the environment: undergrazing of certain pastures and overgrazing of others, impact of protection dogs on wildlife, soil erosion and significant ecological problems, accumulation of manure in night parks (Lapeyronie & Moret, 2007; Vincent, 2010). Finally, predators would not play their role as regulators of wildlife by feeding mainly on domestic animals (Chandelier *et al.*, 2016, Garde & Meuret, 2017, Mounet, 2007), an assertion challenged by biologists and the world of hunting who deplore the lack of studies of the impact of wolves on game populations. According to these actors, the compelling and acceptable elements proving the validity of their point of view are the financial incentives, the financing of agro-pastoral measures (Deverre, 1999), scientific publications and field experience. (Chandelier *et al.*, 2016, Garde & Meuret, 2017)

According to the second view, which brings together other scientists and the APN, it is human activities that disrupt ecological relationships. Guarantors of the natural nature of the environment, the wolves would play the role of regulator of the wild fauna. Perceived as a "keystone" species of ecosystems, they would seem contribute to their good health (Chandelier *et al.*, 2016; Mounet, 2007). The evolution of agro-pastoral

activities, in particular the increase in the size of the herds and the reduction of guarding and supervision, would have led to the loss of their positive effects (Chandelier *et al.*, 2016).

Spatial scale

As early as 1998, the PNM's scientific council called for an assessment of the environmental consequences of "high-mountain" protection measures (Lapeyronie & Moret, 2007). The controversy is widening with the geographic expansion of wolf populations and is becoming national (Chandelier *et al.*, 2016).

Mobility and permeability of controversies

- Socio-economic impact of the presence of the wolf.
- Agro-environmental policies and the impact of pastoral activities on biodiversity.
- Necessity and relevance of population regulation.
- Impact of wolves on game populations.

2.6. Conclusion

The parallel analysis of five important controversies that surrounded the return of wolves in France shows that they are successive but especially that they accumulate, intermingle and feed on one another. The emergence of a new controversy does not lead to the disappearance of the previous ones. Some controversies appear or are accentuated through the attenuation of others that will remain buried until they are taken up again, will be kept in the background, or will eventually die out. Their description highlights the strategic nature of stakeholder positions and the complexity of these positions and their evolutions. The third part of this report will be devoted to a dynamic socio-ecological study of conflicts. It will return in a transversal way to the controversies; Their genealogy, and the explanation of the factors that trigger them or cause them to move, will help clarify the complexity of the conflicts surrounding the presence of wolves in France.

3. FROM THE GENEALOGY OF CONTROVERSIES TO THE DYNAMIC STUDY OF CONFLICTS: HUMANS AND ANIMALS CAUGHT IN COMPLEX SITUATIONS

In this section, we propose a contextualized and dynamic analysis of the conflicts surrounding the return of wolves in France from a cross-sectional perspective of the controversies. Putting the opposition between pastoral breeding and wolf protection back into a wider reality - including a series of social actors, animals and environments - will enable these conflicts to be approached more systematically. We will consider all these actors as diverse and changing, and involved in territorial dynamics in constant reconstruction. We will discuss in turn several angles allowing us to develop a socio-ecological approach to conflicts, attentive to the diversity and the complexity of the situations. First, we will highlight the linkages that make it possible to draw the contours of the *territories* concerned (§ 3.1). Next, we will discuss the *construction of knowledge* as an integral dimension of conflicts (§ 3.2).

3.1. Territorialising conflict analysis

The tensions between pastoral breeding and protection of wolves concern a diversity of social actors, animals and environments involved in territorial dynamics in constant reconstruction. In the following, four dimensions are approached successively so as to apprehend this complexity:

- The reactivation of older tensions between pastoralism and environmentalism,
- The articulation between several spatial scales, global frameworks and local specificities,
- The specificity of long-term dynamics in a conflict that has persisted for twenty-five years,
- The place of symbolic questions.

The wolf as a "new scene" of tensions between pastoralism and protection of nature

First arriving in the Alps and in pastoral territories, wolves made the relationship between two "worlds", that of pastoralism and the protection of nature more complex (Mauz, 2008, p.92). At a time when agri-environmental measures (MAE) summon pastoralism to maintain environments, or even reconquer open environments, the return of wolves complexifies or even calls into question the work of rapprochement between conservation issues and agro-pastoral issues.

The history of the territories concerned is marked by tensions around the arrival or return of new species, or their change of status (in particular, their protection). On these occasions, the animal becomes a vector of various social issues. The question of the role of pastoralism in the maintenance and life of the mountains is reactivated. The pre-existing rural problems are revived by new changes embodied by the figure of the ecologist defending large predators. This recurrence reveals the transformation of uses, between economic reality and sociological recompositions. It underlines the difficult balance of different projects for rural areas undergoing rapid change.

A return that reveals and accelerates the mutations of the agricultural world

Different specific ecological and socio-territorial factors have benefited the recolonisation of the French territory by wolves from Italy (Mauz, 2006b, Benhammou, 2009):

- Protection of wolves in Italy since 1973,
- Agricultural decline and increased forest cover,
- Hunting plans and reintroduction of game species,
- Creation of many protected areas.

The conflicts surrounding the return of wolves have been described as a reflection, among others, of contemporary changes in the agricultural world in relation to the rise of environmental protection. For some decades, the legitimacy of the farmer as a food producer has been disputed (Deverre, 1995). In this context, the livestock world was the object of a series of interrogations (pollution, health problems, climate change, animal welfare...), associated with exogenous definitions of what the professions concerned should be. In return, professional rhetoric enlisted the return of the wild to express their difficulties and a feeling of abandonment and helplessness in the face of rapid environmental dynamics (Granjou & Mauz, 2009b).

The return of wolves, therefore, complicates the relationship between agro-pastoral practices and the environment. This is all the more palpable as the official date for the return of wolves to French territory (1992) coincides with the beginning of the contractualisation of the MAE. Pastoral activities find a renewed

legitimacy by asserting their ecological role, in opposition to the dominant logic of an agricultural policy leading to industrialization. This renewed legitimacy was confirmed subsequently with the succession of several generations of MAE (Vincent, 2009).

The discourse that opposes public policies favouring the resettlement of wolves, denounces a deliberate intention to "rewild" rural territories, especially in the mountains. Large predators, such as the wolf and the bear, embody this celebration of a "wild" nature (Bobbé, 2002). This "rewilding" is described by detractors of the return of the wolves as a new project of society concerning the mountain territories that would exclude humans, Benhammou even imagining the possibility of using the strong expression of "anti-humanism" (Benhammou, 2009). For some of the breeders, protecting a predator previously considered harmful - in relation to the constraints it imposes on their activities - amounts to denying their existence (Mauz, 2009). From this point of view, the 'ecological' colonization of the wolf reflects the invasion by a way of life associated by its detractors with the ecological vision of an urban world supported by the central power. However, interviewed actors stressed the reductive, if not caricatural, aspect of this rural-urban opposition.

The policy of compensation for losses and the financing of measures for the protection of herds - assistant shepherds, night parks, dogs (see Box 4 - Protection dogs) - aims at equipping and empowering livestock producers faced with predation. This empowerment, which leads to a confinement of livestock breeding and a loss of sovereignty for breeders, is strongly criticized (Chabert *et al.*, 2004). At the same time, the closure of landscapes is pointed out as the symptom of land abandonment and a decline in lifestyles associated with agro-pastoralism. It also refers to other economic and ecological issues (Vincent, 2014). Nevertheless, the importance placed on the maintenance of open environments is discussed by authors who highlight the necessarily dynamic dimension of landscapes over the long term (Benhammou, 2009). This reflects the opposition between *land sharing* and *land sparing*, which can help us to grasp the different ways of anticipating the future of rural territories. Where supporters of the former are concerned with the reconciliation between human activities and the conservation of biodiversity, proponents of the latter are apt to consider the evolution of these territories either towards intensification or towards forms of "rewilding" (Desquilbet *and al.*, 2013; Bennett, 2017).

In addition to economic and professional weakness, this situation creates emotional difficulties for breeders. On the emotional level, the interviews show a very strong sense of denigration and relegation, reactivated during debates surrounding the protection of herds. The interviews thus report on the suffering caused by the charges of not protecting their animals properly while the attacks persist despite fences and protection dogs. This accusation adds to all the stigmatizations and interpellations that describe them as bad workers.

Box 4 - Protection dogs

In continental Europe, the technique of protecting herds by dogs became less frequent in the course of the nineteenth century with the decline in wolf populations (Planhol, 1969). Still used in Spain and Italy, it is still practised very marginally on the French slopes of the Pyrenees for the protection of herds against bears (Bobbé, 2000b). With the return of wolves to France in the early 1990s, the Montagne des Pyrénées, which had been kept as a pet, was then used for the protection of herds. It is also the case of other canine breeds such as the Maremma Abruzzi and the Anatolian sheepdog (Moret, 2007). It is estimated that about 1600 protection dogs have been introduced in France since the return of the wolves; maybe 1200 in the Alpine massifs (www.ipra-landry.com). The mission of the protection dog is to deter the intrusion of predators near the herd. Several basic behaviours condition its effectiveness: attention (maintaining permanent contact with the herd), loyalty (absence of predation), protection (reaction to strange or new activities) or sociability to man (tolerance or indifference) (Landry, 1998, Moret, 2007).

Only using protection dogs, although effective, does not allow a complete prevention of predation by wolves. Some authors recommend the adoption of protective strategies combining several means of protection, both lethal and non-lethal (Espuno *et al.*, 2004; Gehring *et al.*, 2010). Moreover, if using protection dogs helps protect the herd, this is accompanied by constraints for the breeder. Socialising a puppy with sheep requires a good knowledge of dog behaviour, a lot of availability and patience. The presence of protection dogs also leads to additional work and calls for substantial financial investments (Landry, 1998). It should be noted that the presence of dogs on alpine pastures questions the multi-use of these spaces, encounters between hikers and guardian dogs may indeed prove problematic (Vincent, 2010). Negative consequences may nevertheless be limited according to some authors through careful selection of breed and individuals as well as adequate assimilation of the dog to the herd (Gehring *et al.*, 2010).

Finally, the effective use of protection dogs is difficult in some livestock systems, especially when livestock farmers practice allotment. The division of a large herd into several lots requires the mobilisation of a large number of dogs. Densely populated or much visited areas can also complicate the use of these dogs, which can generate conflicts with the neighbourhood (barking, wandering, aggressiveness, etc.) (Gehring *et al.*, 2010).

Beyond the confrontation between "great paradigms", multiple opposition games

Many opposing plays exist in the conflicts surrounding the return of wolves in France, that go beyond the opposition between pastoralism and nature protection. A diversity of local scenes therefore confronts the great polarizing stereotypes.

This is due primarily to the ambivalence of the status of wolves, which can now be considered "problem animals" as defined by Micoud and Bobbé (2006). This category refers to animals which can both represent a nuisance for certain human activities and benefit from a legal, social and environmental context favourable to their maintenance. The territories concerned are thus both the seat of confrontations between humans and animals, linked to the management of the damage caused and social conflicts caused by these animals, between actors with divergent positions (Mounet, 2008).

For the wolves, two forms of existence are confronted: they are at the same time threatening animals to be protected and threatened animals to protect. The question of threat and protection is therefore considered in a reciprocal way, at European level (Stöhr & Coimbra, 2013) and in the French case (Doré, 2015). The global threat to the wolf population is understandable at the national or even European level, but it is at the local level that it causes harm to livestock (Doré, 2015).

Over and above the economic argument - challenging agro-pastoral activities for the protection of protected wild species - the conflicts surrounding the return of wolves are part of the balance of power and plural

asymmetries (e.g. between political elites and local populations). At the heart of environmental conflicts today prevails the will of the protagonists to assert their reading of the world and to install it in a field of legitimacy (Mormont, 2006, Collomb, 2009). Legislation, knowledge, statuses, links to territory and animals are all tools used to this end, and are shared more or less equally by scientists, environmental managers, associations for the protection of nature and animals, the general public and rural and indigenous communities (Manceron & Roué, 2009). If these different oppositions can structure the conflict and be operative as forms of social differentiation, these major lines of fracture must be put into perspective (see, for example, Doré, 2011) and they can mask other lines of sociological forces that are also structuring (See Martin, 2012a, 2012b). For example, in Sweden, Dahlström (2009) uses, in a very specific context, the term "eco-colonialism" to refer to the rejection of wolf protection policies by rural populations, especially the indigenous Sami peoples. These policies are perceived to run counter to a way of life that is partly based on forest frequentation, livestock and hunting. The same type of argument is mobilized by the hunting world against the protection of the cormorant and the swan in the Baie de Somme (Raison du Cleuziou, 2007, 2008).

Because of the asymmetries that characterize it, the question of "measure" concerning wolves and the damage they cause or suffer has a role to play in the conflict. These asymmetries concern the global or local understanding of damage - for the wolf and for breeders - and taking into account non-quantifiable dimensions, such as the emotional link of breeders to their animals or the morale of the breeders (Porcher, 2002, 2011). Wolf attacks are traumatic events, especially if several beasts are killed or wounded without being consumed, attacks experienced as a personal and professional "drama"² that may push some breeders to abandon their activity³ (Vincent, 2014). Moreover, the resolution of controversies can itself increase the asymmetries between actors or generate new ones.

Measure against measure: persistent asymmetries between the measurement of threats to livestock and the wolf

The coexistence of the threatening wolf figure and the threatened wolf figure presupposes two differentiated forms of threat measurement and treatment that reveal asymmetric treatment: the protection of the threatened wolf is generally dealt with at national level, while the struggle against the threatening wolf is treated more at local level. If the two juxtaposed systems theoretically allow us to negotiate the "bearable thresholds" in a context where reciprocal threats are "incommensurable", the reality on the field is much more complex (Doré, 2014).

The figures for damage caused by wolves deserve to be put into context: the total number of animals killed at national level, which is close to 10 000 for sheep farming (2016), refers to heterogeneous realities at the local level. Some farms are very frequently affected, while others are affected occasionally or as yet not at all. The place occupied by livestock in a given territory also influences its vulnerability. In a territory with few livestock farmers, predation pressure is concentrated on a few herds, whereas it is *a priori* more disseminated when there are more farmers in a given territory. As to the means of protection, it emerges from the interviews that their effectiveness depends very much on local situations and must be related to the working conditions of breeders and shepherds. The human support they receive when they are attacked play an effective role in the protection of herds. However, the work overload and the lack of recognition

² The term "rape" was mentioned during the interviews.

³ See the short film Breeders, the invisible bites, www.msa.fr/lfr/accompagner-les-eleveurs-touchees-par-les-attaques-de-loups.

and accompaniment of the moral and psychological part associated with a strong and repeated predation can participate in a saturation and exhaustion effect which leads to a radicalization compared to initial positions which could have tolerated predation to some extent if it had remained at a low level and sporadic.

Conflicts involving multiple spatial scales

The notion of conflict is usually associated with explicit and public situations that are "expressions of protest or opposition", distinguished from simple tension because they involve a commitment (action, public speaking) (Torre *et al.*, 2006). Nevertheless, in view of the particular permeability between different contexts of action around conflicts concerning large fauna, an enlarged view of the conflict, attentive to "all explicit or more implicit commitments" expressed in various contexts of action of actors, can be proposed (e.g. Alexandre & Mounet, 2008). These involve different spatial scales.

Assigning responsibilities: the case of protected areas

The wolves returned to France in the Mercantour National Park. However, it appears that the local presence of a protected area such as national parks generates difficulties linked to the reactivation of tensions surrounding the creation of the park or conflicts over land use (livestock, tourism, protection).

Beyond the conservation of a particular species, the negotiations surrounding the creation of protected areas lead to the discussion of the global consideration of the environment in the forms of spatial planning and use. These debates are rarely peaceful. The frictions have different roots depending on the location (Larrère *et al.*, 2009).

Particular regulations in the heart of national parks and nature reserves can further fuel controversies about the role of protected natural areas in the increase and change of behaviour of large wildlife.

The "living together" between macro social and micro social logics

The great polarities are found both in the discourses expressed and in the level of the practices (e.g. demonstrations, material degradations, violence). However, the positions of the actors vary according to the contexts of expression (locally or at national level). At the micro local level, arrangements can be made more easily, according to general principles of living together which tend to replace stereotyped positions (Mounet, 2012). There is also the question of the representativeness of the spokespersons present in the national negotiating structures (interviews). It can be hypothesized that centralized management in France does not facilitate the existence of effective negotiations at the local level. Conversely, the question of the legitimacy of a local resolution of conflicts arises in view of the possibility of establishing a coherent national policy on a national scale. Here, both the question of dialogue between national and local levels and, as a corollary, of a principle of subsidiarity arises.

The role of mediators deserves to be highlighted as a factor in avoiding or mitigating violence. Negotiation requires the existence of interpersonal contexts in which a dialogue can be established. At the national level, this context existed with the National Wolf Group until the APN present in this group suspended their participation in 2014⁴. The possibility of compromise at this level remains nevertheless limited by the role of the institutional spokesperson of each member and the focus of exchanges on short-term management issues, to the detriment of a substantive debate on the medium and long-term development of rural territories and wildlife relations. At the local level, some territories have deployed tools that have favoured negotiation between actors and the adaptation of pastoral practices to the presence of wolves. Parks

⁴ FNE, WWF and the FERUS association

(national or natural regional) have played a particular role in the opening of permanent negotiating spaces. The comparison between spaces with and without mediators provides some insights, some interviews emphasizing the importance of internal collaborations, for example around the MAE, and which allow the existence of a space for exchange (see Box 5 - Examples of local mediation, below). Arenas also exist at the departmental level, the analysis of which remains to be carried out.

One way of linking local and national levels is to analyse conflicts around wolves by distinguishing between macro social and micro social logics and their articulations (Mounet, 2008). If the "macro" logics oppose the partisans of the wolves and their opponents in a frontal way, at the local level the inscription in one or the other "camp" operates as a tool of collective identification for the actors. From a "micro" point of view, several key players, called "territorial operators" (Mounet, 2007), intervene by recombining positioning and producing differentiated and sometimes more complex local situations where radical inscription on one side or the other is no longer as much claimed. These actors have different profiles:

- Certain individuals may play a mediating role, especially because they belong to several social worlds, hold legitimacy there and understand the logics of action of the different parties. Conversely, an individual or an institution may be assigned a "scapegoat" role or at least be designated as responsible for the problems that affect one or the other (e.g. a national park as an institution),
- Personalities can also encourage the persistence of the conflict, some people finding in this interaction "the struggle of their lives" and remain in a radical position, or others stirring up conflict because they find personal and collective satisfaction. The involvement for more than twenty years of some actors in the wolf case can thus contribute both to an improvement in the conflicting situations due to the progressive acquisition of knowledge and skills and to their deterioration because of the first attachment to objectives that the presence of wolves or pastoralism conflict with. These individual peculiarities are also found among animals, the individual behaviour and personality of which can aggravate or, on the contrary, mitigate conflicts (inter-individual variability).

Box 5 - Examples of local mediation

Mercantour National Park - In 2002, ten years after the official return of the wolves and in a context of intense tensions with the professionals of the breeding, the PNM recruited a pastoralism task officer. The latter undertook a mission of mediation between the professionals of pastoralism and the agents of the PNM. Two years later, under the impetus of the new director of the park, days of meetings with scientists were organised. Their main objective was to build a "shared vision" of the problem. Their success leaves a hope of a rapprochement between the park and the pastoral world (Granjou & Mauz, 2012).

Hauts Plateaux du Vercors Natural Reserve - The first settlement of wolves in the Vercors, the Hauts Plateaux Natural Reserve is located in the Vercors Regional Nature Park. At the time, the context was favourable to dialogue between the actors of the environment and the pastoral world. As early as 2000, the PNR president acknowledged the presence of wolves while stressing the legitimacy of pastoralism. The pre-existing dialogue bodies ("pastoralism" working group at the beginning and end of summer pasture) are used to exchange on the theme of wolves with breeders and shepherds. They were reinforced in 2004 by organising an annual meeting on the Hauts Plateaux between the president of the park, its agents and transhumant herders and shepherds. The PNR plays the role of mediator by creating and maintaining a context favourable to consultation (Mounet, 2006a, Mounet, 2007).

Queyras Regional Nature Park - The first predators of the wolves in the Queyras PNR took place in the summer of 1997. The park and its local partners (DDAF and CERPAM) are implementing measures to help sheep farmers. In 1999, a Wolf commission was set up to consider more appropriate measures in the context of a programme to support pastoralism: helicopter transportation of construction site huts and new constructions, setting up of a radio network (Radio- Shepherds) and the establishment of a pastoral brigade. These measures will encourage an increasing acceptance of the protection measures required by the State (Vincent, 2007)

Nohèdes Nature Reserve - The presence of wolves in the Nohèdes Nature Reserve is genetically confirmed in 1999. Despite the tensions between certain professional agricultural representatives and local environmental actors, the first breeder affected by lupine predation in the area receives both the support of professional representatives of livestock (Pastoral Grouping, Inter-Chamber of Agriculture Mountain Breeding (SIME)) and certain local actors of hunting and the environment (ONCFS, Reserve of Nohèdes) who work in partnership to promote cohabitation. The Pastoral Farming Group provides financial support to the breeder and the SIME technical support while local environmental officers contribute to the official recognition of the presence of wolves. In order to ensure better responsiveness and to avoid frequent administrative delays, the custodian of the Reserve suggests setting up a Public Interest Group (GIP) in each new settlement area (Benhammou & Salvador, 2003).

In particular, the creation of protected areas leads to the emergence of territorialized environmental actors who have the dual obligation to apply environmental regulations in the framework of their missions and to integrate the expectations of other actors in the territory (Émerit, 2007). This situation offers the possibility of mediation and experimentation but, as we have seen, it can also promote polarization and concentration of discontent on these actors.

The notion of "frontier space" makes it possible to analyse the place of mediators also referred to as "conciliation contractors" between agriculture and nature protection. A study carried out in three protected areas of the Alpine region (Granjou & Mauz, 2012) showed how the encounters between the agricultural and the protection of nature world are more of technical experiments rooted in social experiments linked to specific professional trajectories (See the notion of sociotechnical experiments, Lascoumes *et al.*, 1997) rather than a large conciliatory paradigm that would apply locally (see Box 5 below).

Long-term conflicts affecting new territories... and persisting elsewhere

The conflict with the wolves is old and new "fronts" appear as the range extends. This leads one to consider the relationship between the long history of the return of the wolves and the successive scenes of the conflict. It seems necessary to take into account the social, economic and regional and national historical

context for each territory concerned (Lescureux & Linnell, 2013). The long duration of conflicts establishes a necessarily dynamic dimension, with effects of habituation and learning but also of saturation. It acts as a collective learning opportunity for social actors, towards the establishment of more integrative approaches to conservation policies (Åkerman *et al.*, 2016).

Recurring patterns and differentiated territories

Wolves act as important actors in the transformation of breeding in the long term and, indirectly, in all practices related to pastoral areas, especially tourism activities. Recolonisation takes place in a particular historical context. In the Alpine arc, sheep farming was largely associated with polyculture until the end of the nineteenth century. This system was gradually abandoned in favour of a specialization in pastoralism. The intensification of agriculture after the Second World War led to an increase in the size of the herds, a decrease in the number of farms and a withdrawal to the areas most adapted to mechanization. The economic support measures for livestock breeding, in a context of increased international competition linked to the globalization of trade, encourages this development. In the context of the creation of protected areas, the defence of forests against fires and the contractualisation of MAE, some previously abandoned areas were reinvested (Alphandéry & Billaud, 1996, Bobbé, 2002).

The different "scenes" of the conflict refer to different moments in the history of the return of wolves and, more generally, to the public consideration of environmental issues in France. While the 1990s have brought to the forefront environmental issues related to land use planning, there has been some retreat on this issue (see, for example, Barré *et al.*, 2015). The different statuses of sheep farming from one territory to another, its economic importance and the level of organization of the professionals also intervene (interviews). The arrival of wolves and the occurrence of herd attacks in the region of production of Roquefort centered on the Aveyron, and extending to the communes of Lozère, Gard, Hérault, Tarn And Aude, raise new questions in view of the particularities of the sheep farming practiced there. Here there is the question of zoning, a bulwark to the inevitability of an unwanted coexistence. The first zoning projects that proposed two options - limiting the presence of wolves to animal parks or confining them to the mountains - were rejected. Beyond the obvious difficulty of limiting the movements of a highly mobile, colonizing animal with great dispersal capacities, the zoning option, which is now called "differentiated management", has the disadvantage of creating territorial inequalities, with territories where wolves would be excluded and others where they would be accepted (Bobbé, 2002, interviews).

There are recurring patterns on each new front of colonization (interviews). Politically and technically, the interviews highlight a lack of foresight in the newly colonized territories. Before the arrival of the wolves, the problems encountered and the solutions implemented in the territories already colonized were considered to be unthinkable "here". When their arrival is effective, it is first necessary to "prove" their presence - using photos or other identification tools - and their responsibility in cases of predation. Accompaniment then takes place gradually, *a posteriori*, and is not sufficient to prevent situations of crisis from being repeated (interviews).

If it can improve adaptive capacities, the experience gained over time can also generate situations of tension more quickly. The "naivety" faced with the wolves of the first colonized territories evoked during the interviews contrasts with the lassitude installed over time among the breeding professionals and with the conviction that the proposed measures "do not work". This evolution of the positions of the professional representatives provokes secondarily stronger and more immediate resistances in the new territories concerned (interviews).

Persistence of problems in long-colonized territories

In regions having long been confronted with wolves, husbandry practices have changed. They have managed to reduce both damage and conflicts without successfully eliminating them, including in the first sectors concerned. Economic instruments have been mobilized at different levels (LIFE programmes at European level, and national "wolf" plans). A set of measures has been proposed to breeders and shepherds to help them adapt their practices to the constraints related to wolves: compensation for animals killed and combined measures for protection of herds (including funding for herder aids, protective dogs and mobile pens for night groupings).

The limitations of these schemes have been highlighted, such as inadequate compensation for the "real costs" of predation and, beyond that, losses that are not only material for livestock farmers (Bacha *et al.* 2007).

Furthermore, the ability to adapt differs depending on livestock systems. Large herds are more adaptable than small-scale farms or those who practice allotment (Garde *et al.*, 2007a; interviews). Low-visibility areas (moors and forests) and very rugged or steep areas, difficult to fence, are more vulnerable and tend to be abandoned (Garde, 2002). Some interviewees regretted that the abandonment of pastoral livestock sectors and cessation of farming activities due to lupine predation were not documented and stressed the need to pool and update data on this subject.

The protection of flocks against wolves, studied in terms of the constraints it imposes on the territories (Garde *et al.*, 2007a, Garde *et al.*, 2007b), is part of the adaptation of pastoral practices to social, economic and environmental changes. It therefore deserves its rightful place in the reflection of long-term prospective scenarios (Bataille *et al.*, 2016).

The conflicts surrounding the return of wolves must therefore be seen as long-term environmental conflicts, likely to persist for decades. Understanding the determinants is a necessity but not enough to appease them. Several factors may help to maintain them long-term: lack of investment in experimentation and the reactivation of conflicts between actors at the micro-local level. This analysis points to the interest of an analysis of environmental militancy taking into account their different dimensions (technical, social, and emotional). (Åkerman *et al.*, 2016, Ratamáki & Lähdesmäki, 2015). Developing shared narratives (involving a cultural and symbolic dimension) and incorporating them into the construction of a rational argument can, on the contrary, help to appease them. Although it is a subject far less conflictual than that of lupine predation, the "sentinel pastures" system can serve as an example here. It brings together a number of actors (environmental, pastoral, agricultural and scientific) to document the adaptation of agro-pastoral socio-ecosystems to climate change (Dobremez *et al.*, 2014).

Discussions on the place of wolves in France which also have a symbolical importance

The resettlement of wolves in France participates in blurring the borders between wild and domestic. At the heart of these conflicts are questions of categorization and definition⁵. There are no more animals that could be classified definitively in the category of pests or game, without these definitions giving rise to conflicting debates here or elsewhere. The emergence of counterintuitive definitions such as "useful pest" or "protected predator" results from this process, which can lead to the hybridization of historically exclusive categories (Manceron & Roué, 2009). The controversies surrounding the consequences of the

⁵ The abandonment of the term pest in favour of the periphrase "likely to cause damage" in the law for the reconquest of biodiversity, nature and landscapes testifies to the recent consideration of the historical and spatial dimension of this category.

presence of wolves and the legitimate actions to be carried out question the differences in the understanding of the "good place of the wolf" in the landscape.

What place for the wild animal?

As soon as they arrive, wolves colonize the public and media space well beyond their actual occupation of the mountain areas. They represent the displacement of categories concerning relations with nature since the end of the 20th century. The transgressive movement of the animal in space is questioned through its "recalcitrant" and "elusive" character - it hides from view, thwarts the tracing devices, ignores the distancing schemes - and its capacity to colonize the public space well beyond its physical presence in an area (Doré, 2010a).

The strict protection of predators, which is initially accompanied by a total ban on hunting and any disturbance of the animals, upsets the relationship to natural habitat and animal practices (Bobbé, 1993). Since the 1990s, this protection has been described as part of the emergence of a new "culture of the wild" that challenges the old forms of categorization of the living world. The primary definition of the term wild refers to everything that escapes domestication, understood as a process affecting species and spaces. A wild animal is therefore uncontrolled and can represent a potential hazard to domestic animals and crops. In the context of an environmentalist policy, a new culture of the wild as something good to manage emerges (Bobbé, 2002). The status of pest would then be replaced by a categorization linked to a context situated in time and space; a creature momentarily and locally proliferating.

In the case of the wolf, the confrontation takes place between different cultures of the relation to the environment, agrarian and environmentalist, but also between two logics of use of space, productive and recreational (Mounet, 2006b). At the same time there is a collision between two opposing statuses of the animal: its legal status and its customary status (Bobbé, 2000a). The first makes the wolf a good animal to manage, in terms of its protection (monitoring, counting and initial absence of harvesting). The second involves protection from attacks by an unpredictable and uncontrollable wild animal. In the Macedonian context, it has been shown that this term "uncontrollable" responds directly to the specific behaviour of this species in relation to other major predators (Lescureux & Linnell, 2010a). This confrontation between two meanings of the wild fuels the expression by the breeding world of a need to be able to defend oneself or react materially to attacks. Faced with the sustained spontaneous colonization and population growth, the aim is to keep wolves well away from humans and domestic herds.

Very large coverage in the public sphere and the media

The over-investment of the return of wolves by the media has helped to reactivate the very old fascination for the predator.

On the one hand, the media stories revived the fear of the wolf. This is reflected in the echo resulting from these stories and the recurrences, made of ambivalences, which accompany them:

- The indefinite identity of the animal between wild dog and monstrous beast,
- The fantastical dimension, revived and cultivated (Litz, 2008),

On the other hand, animal films, in favour of protection and giving voice to only certain social players, and children's literature, participate in the construction of emotional commitments to animals that are not part of the everyday life of spectators and readers (Dalla Bernardina, 2002). As this is the only way for many to come into contact with the wild animal, they form an image of the relationship between wolves and pastoral activities which, depending on the case either resembles an absence of relationship or is considered by some protagonists to simplify the subject to the point of caricature, making little of pastoralism (interviews).

Towards a contextual study of images associated with wolves

Analysing the relations between humans and animals, taking into account their reciprocal influences, requires a reflection at the crossroads between the material and the symbolic. The representations associated with wolves need to be understood in relation to their behaviour (Lescureux 2006, Lescureux & Linnell 2010a) and to be considered within a set of interactions between species in a given territory.

An animal endowed with contradictory and changing values throughout history

The great predators, wolves and bears in particular, occupy a special place in the European bestiary. These species are invested with ambivalent, antagonistic, contradictory values (Bobbé, 2002). Before the advent of Christianity, various symbols are associated with the wolf, which is an important and ambivalent figure of the mythologies of all the regions where it is present. It represents, as the case may be, an ancestor animal (filiation), masculine and feminine fertility or, finally, light. Medieval Christianity increasingly associates the wolf with the devil as opposed to the pastor god. In contemporary times, a reversal appears: from a demonized animal, the wolf has been *sacralised* by its most assertive defenders. By the mid-1990s, Mech, although involved in wolf rehabilitation in the USA, warned against the emergence of a new mythology linked to this animal (Mech, 1995).

Lupine anthropophagy complexifies this figure and the ambivalences that characterize it. To the mythical figure of the big bad wolf is opposed the popular belief, spread through books written with a view to rehabilitating the species, according to which the wolf would naturally fear man (Doré, 2010b). If it is not inconceivable that a direct confrontation takes place with the risk of an accident, this risk remains rare (Linnell *et al.*, 2002), given the plasticity and behavioural diversity of the wolf.

An animal integrally part of local bestiaries

The representations associated with the wolf can also be understood within a local bestiary, by taking into account all the animals interacting with humans in a given territory (predators and prey, wild animals and domestic). The wolf can thus be compared with other large carnivores when they are present together:

- In Spain, the combined presence of the wolf and the bear on the same territory leads to minimizing the problems posed by the bear compared to the amount of damage done by the wolf. Moreover, the existence of a domestic double (the dog) returns the wolf to an animality essentially perceived as negative (Bobbé, 1993),
- In Macedonia, the analysis of how the bear, wolf and lynx are perceived in relation to their behaviour gives the wolf a different status from the other two species. The lesser frequency of bear attacks associated with a symbolic status of "king of the mountains" places the animal's nuisance at the individual and territorial level, identified with problem animals in particular territories, which can be eliminated if necessary. The lynx, less numerous, not very visible and inhabiting remote places, are seen in this bestiary as ghosts. Finally, wolves, more frequently encountered, cause more damage to livestock and transgress the boundaries of the areas occupied by livestock and by humans by entering into the villages. Their nuisance is all the stronger because it is impossible to control them, their behaviour making them difficult to individualise and to localise, allowing only intervention at the population level: population regulation or eradication (Lescureux *et al.*, 2011).

3.2. The construction of knowledge as a real dimension of conflict

The aim of this sub-section is to address the political and social issues of knowledge production as an integral part of the conflict. Several lines of thought are proposed:

- The role of the building of scientific and technical expertise,
- The number of wolves as a number at the heart of the relationship between the construction of expertise and the administrative response of the State,
- The problem of the link between field experience and scientific research, based on the case of herd protection.

The role of scientific and technical expertise

The reappearance of wolves forced the actors concerned to learn once again about how to understand and interact with an animal long absent from French territory. The knowledge deployed by these parties is very diverse and is constructed in a context of conflict. It is young, hierarchical, fragmented, and compartmentalised knowledge, including within scientific knowledge, which addresses different subjects (ecological, ethological, pastoral, hunting knowledge etc.).

Since the 1980s studies in the sociology of science have established that the production of scientific knowledge does not resolve controversies but displaces them and generates new ones (Akrich et al., 2006). This can indeed be seen by examining the successive disputes surrounding the question of the origin of wolves, their number and their danger for herds, as well as for humans.

The origin of wolves, and in particular estimating their number, has resulted in the production of much scientific knowledge. The controversy over the origin of the wolf has led to a massive genetic instrumentation that has established their Italian origin, without completely extinguishing the controversy over their reintroduction. It is possible that disagreements on the origin of wolves will reappear but the scientific knowledge produced tends to make this an outdated discussion in the public arena. The controversy has shifted to other subjects, such as the number of wolves. The figures do not extinguish controversies, but often feed new ones, establishing knowledge but also thresholds which are instruments of governance, regularly subject to review and criticism⁶. Conversely, the acquisition of new scientific knowledge can reactivate a controversy, as was the case of the work carried out by the historian Jean-Marc Moriceau on lupine anthropophagy (2010, 2011, 2013, 2016).

The accepted results can finally be re-debated in a context of "production of uncertainty". Reducing uncertainty allows us to question the positions. (Mermet & Benhammou, 2005, for the bear case in Béarn, Callon *et al.*, 2001, for a more general discussion). It also refers to the temporal dimension of environmental knowledge and its sustainability (Åkerman & Peltola, 2002).

The number of wolves, a figure at the heart of the relationship between the construction of expertise and the administrative response of the State

We must look again at how the scientific and technical expertise is constituted, which underlies the administrative response to the return of the wolf.

Through its various representatives, the State combines roles and functions. It intervenes in negotiations, makes decrees and sends agents into the field. It is both policeman and producer of knowledge, it takes note of damage and compensates the victims.

The ONCFS, the technical referent for the Ministry of the Environment, is at the centre of a logic of support of public policies on quantitative productions of biologists. The production of a strong quantification that

⁶ A. Desrosières, returning to the history of the development of the statistical tool in public policy, was able to show how the statistics, if they appear as a qualitative product, as a scientific tool that provides useful data to society, also serve as instruments of power through a "policy of large numbers" (Desrosières, 2016 [1993]). In turn, unquestionable and suspected of lying, the figures are thus conferred a particular institutional weight (Didier, 2011).

is as little questionable as possible appears as a solution to overcome a situation of uncertainty and mutual distrust between the different interlocutors (Marboutin & Duchamp, 2005). In the production of knowledge about wolves in France, the ONCFS occupies a central position (production, verification and validation of field data) and collaborates for analyses with academic scientific institutions, in particular in biology. Despite its efforts to produce independent research of academic quality, the ONCFS does not, however, enjoy the same image of neutrality as academic scientific institutions. It is, for example, still perceived by some naturalists to be close to hunting and historically linked to the world of animal husbandry. In this context, using quantitative data and favouring an approach through numbers appears to be a way of establishing and legitimizing uncontroversial scientific results and of transposing this central scientific legitimacy of figures to public actions (Porter, 1995).

The first stage in the work of counting wolves involves gathering evidence of their presence in the field (samples, traces, etc.). This operation is carried out by the correspondents of the *Wolf-Lynx* Network composed of State officials and volunteers. Genetic analysis is then carried out on the samples collected to confirm the wolf species, to distinguish the different individuals and to count the individuals detected. This data is then analysed by bio-mathematicians to estimate the size of the population (Doré, 2013).

In this respect, the actors in the field, in particular union representatives and local elected representatives appear defiant. Thus the comparison of different results according to the counting methods, which can be seen as a desire for transparency, paradoxically contributes to undermining the confidence of the actors in the published results.

From the point of view of the State, the emphasis placed on counting the wolf population in France can be seen as an instrument of "open air" control of wolf populations, made possible by "the invention and the implementation of methods for the identification and follow-up of individuals, associated with statistical tools for simulating population dynamics which make it possible to characterize, by decrypting a few signs of presence, a population as a partially controllable object of knowledge and power" (Doré, 2013).

Although the State seems to be a source of proposals to help the breeders to adapt, its position is perceived in different ways. It is fragmented because of the simultaneous involvement of the Ministry of Agriculture and the Ministry of the Environment and the tensions between their respective objectives. In addition, the *Wolf-Lynx* Network, which has so far enabled a large amount of data to be produced, has now encountered difficulties with a series of recent blockages (see § 2.2, Effective number of wolves).

A problem of coordination between field experience and scientific research: the case of herd protection

The regulation of interactions with wolves is developing on three fields: monitoring and protection of wolf populations, protection of domestic herds and management of wolves (Chabert *et al.*, 2004). The pooling and development of knowledge on the latter two subjects is still to be strengthened. So far, budgets allocated to scientific research on the wolf have mainly gone to the monitoring network. This choice entails putting aside data not relating to large numbers concerning wolves as well as field experiments concerning wolf behaviour, herd protection or mediation between social actors. Thus, "missing topics" include scientific research as well as local knowledge, both on domestic and on wild animals.

Taking into account pastoral knowledge and know-how

The term "pastoralism" refers to both a professional sector, a scientific and technical specialty, a way of life, a relationship to territory, spaces and to actors (Mounet & Turquin, 2014). The reciprocal shaping of the professional identities of pastoralists and shepherds, pastoral practices, herds and landscapes has profoundly changed over time. It obeys as much to logics of long-term continuity (Vincent, 2010) as to a reinvention

of the ties between humans, animals and environments. This can be seen in the recent revival of interest in shepherding, its professionalization and its attraction to people outside the agricultural or rural world. (Despret & Meuret, 2016a, 2016b)

Examining how the expertise (scientific, technical and practical) for the protection of herds is constructed, mainly entails paying attention to the extent to which pastoral know-how is considered in the management of the problem. While CERPAM and IPRA, in particular, have already carried out an extensive collection of experiments, much remains to be done concerning the analysis of the vulnerability of herds to predation and the testing of means of protection. The development of reflections and experiments concerning the improvement of herd protection can have an effect that is all the more beneficial because they are based on an inclusive approach at three levels:

- By including actors concerned by predation in the production and sharing of knowledge on issues of particular interest to them,
- By believing that the protection of herds plays an important role in pastoral territories,
- By placing this activity and the knowledge associated with it at the heart of the question of multi-use of rural territories.

All the techniques of protection, seen as complementary, are based on the hypothesis that wolves are generally prudent *vis-à-vis* humans. The vigilant and continuous presence of shepherds, their assistants and protective dogs are thus supposed to deter predators from approaching the herds. These measures are complemented by the protection of herds at night in an enclosure (sheepfold or mobile electrified pen near the mountain huts) (Garde *et al.*, 2007a, Vincent, 2010). These changes in practice have complex consequences. They represent a considerable number of constraints, not only technical, but affecting the very structure of the shepherd's activity, its difficulties and the relationship between shepherds and other users of the mountain area.

The cohabitation with assistant shepherds, beyond its utility against the wolves, makes it possible to alleviate the loneliness of shepherds and to take on again the collective dimension of a profession which only disappeared at the end of the great transhumances (interviews). However, it may present material, psychological and economic difficulties, as well as on the training level:

- The reinforcement of guarding represents an important additional cost for farms that is difficult to assume without public aid,
- The living conditions are difficult, the huts, where they exist, are often very cramped. Their improvement also implies an additional cost, which the municipalities are often reluctant to assume in spite of public aid,
- Shepherds and shepherds' assistants must be in a state of permanent vigilance which generates physical and psychological fatigue,
- Shepherd's assistants' work involves complex protection skills, which ideally calls for a greater professionalization of this function. Some authors argue that this professionalization should take place within the environmental protection sector in order to redistribute the work, the consequences of which should not weigh only on the agricultural world (Vincent, 2010).

Protection dogs can cause problems: impact on wildlife, difficulties with neighbours and tourists, etc. (Vincent, 2010). The consequences of their presence therefore concern as much the breeders as the other users of the territories (Garde *et al.*, 2007a).

Although they are effective, night-grouping pens also have drawbacks and could be described as a major factor in the "disorganization of the pastoral system" in the case of breeding suckling sheep in the Mediterranean mountains (Garde *et al.*, 2007b): overgrazing and enriching the soil here, undergrazing and the closure of certain areas elsewhere, excessive trampling of paths and erosion, increased fatigue of shepherds and animals, reduced grazing time and less feeding of animals.

The protection of herds gives rise to different strategies, the impact of which can be felt right down to the heart of the production system (lambing season, type of lamb produced, sizing of equipment and feed stocks, increase in the length of time and difficulty of work etc.). It is an important driving force in the transformation of practices involving compromises between herd protection and the maintenance of the effectiveness of the pastoral breeding system.

The obligation to adapt to the presence of wolves, which involves the modification of practices and the difficulties in maintaining continual means of protection around the herds, are linked to other factors to fuel opposition to the presence of predators (stress, discouragement, fear of having to abandon the activity, feeling that the breeders have been abandoned) (Garde *et al.*, 2007a). Two scenarios emerge for pastoralism specialists: some farms will tend to become less pastoral to decrease their vulnerability while others, obliged to remain largely pastoral, would remain vulnerable and depend on the public funding allocated for wolf management (Garde *et al.*, 2007b). The actual evolution of farms facing lupine predation, however, needs to be precisely documented, in the different breeding contexts.

Should also be mentioned the much appreciated contributions of the ONCFS⁷ brigade as a reassuring element for the shepherds, highlighted during the interviews. Furthermore, attempting to ask the livestock sector to take on wolf protection as an environmental issue is not always possible or relevant at the present time (Garde *et al.*, 2007a), as may have been the case for large birds of prey in the Luberon (Beylier *et al.*, 2002) or the griffon vultures in the Cévennes (Dupont *et al.*, 2011).

The necessary complementarity between academic research and field experience

The research programmes conducted so far have focused on identifying the threat and its impact. They concern counting, identification (genetics), localisation (mapping) and mechanisms of colonisation of new territories (ecology of dispersion). Moreover, although several PhD theses have been conducted, few major research programmes have been launched, which do not reflect the diversity of issues considered relevant by the various interested parties (breeders, naturalists, shepherds, etc.).

Research in human and social sciences has an essential role to play in taking the knowledge of the actors in the field into account and in understanding the relationships between humans and between humans and animals. However, the lack of public investment in these disciplines means that the modelling work carried out in population ecology has no equivalent.

This observation also concerns the knowledge developed on the ground concerning the adaptation of wolves to pastoral systems. Experimentation concerning the means of protection requires a detailed

⁷ The wolf brigade, created in September 2015 at the initiative of the Minister of the Environment, is under the responsibility of the PACA-Corse inter-regional delegate of the ONCFS. At the time, it consisted of 11 officers: 1 brigade chief and 10 officers. Its members participate in reinforced defence shots in support of livestock breeders and in the monitoring of the wolf population. Based in the Alps of Haute-Provence, it has to intervene mainly in the departments of the alpine arc strongly impacted by the presence of the wolf. In November 2016, the Ministress created a wolf brigade for the Massif Central and reinforced the national brigade of three officers.

knowledge of the different species involved, taking into account their behavioural plasticity and their adaptive capacities.

Several interviewees noted the little progress in scientific knowledge on the ethology of wolves in Europe. The elusive, stealthy character of wolves makes it difficult to understand the different behaviour of packs on the ground. Wolves have so far been considered mainly from the demographic point of view, while behaviour (especially predation), their interindividual or inter-pack variations are little studied. The available knowledge has been produced in other contexts, regional, but also ethological (captive, reintroduction). The few wolves that have been tracked by telemetry in France have been tracked over a short period of time, providing insufficient data to allow for a thorough analysis. However, it should be emphasized that the data provided by the monitoring of a few individuals equipped with radio collars was of great interest to local actors (ONCFS, 2011).

In the field, innovative work in ethology was mainly produced by the IPRA⁸, based on the observation of nocturnal interactions between wolves, protection dogs and sheep, using photographic traps and night vision cameras. In the field, the ONCFS also produces a detailed description of the behaviour of individuals and the particular history of the packs. However, these field observations are not sufficiently disseminated and little considered in decision-making. Yet, they open the door to work on the diversity of hunting practices of individuals and/or packs, the analysis of which would enable the mechanical correlation between numbers of wolves and prediction of predation rates to be overcome. Indeed, the limits of this correlation have been demonstrated in the United States and in Europe, with certain packs or individuals specialising in domestic prey (Linnell *et al.*, 1999, IPRA, 2014, Zlatanova *et al.*, 2014). Although experiments multiply at the local level, human and financial resources are lacking to allow a proper formalisation, which would involve sharing and exchanging practices. No publicly funded research programme has systematically compared the French pastoral system with other pastoral systems. In the case of protection dogs in particular, theoretical stances have been put to the test of field practice and this deserves to be continued (interviews).

It would be interesting to encourage research into wildlife and interactions between wildlife and domestic wildlife by drawing on the rapid theoretical advances in contemporary ethology and behavioural ecology (Benson, 2010).

The actors' knowledge about biotechnical processes can be used in several ways in scientific output (Faugère *et al.*, 2010). The work of the shepherds has thus been the subject of several publications dedicated to their valorisation with a view to innovation (Lécrivain *et al.*, 2004, Meuret, 2010, Linnell & Lescureux, 2015). In these studies, the ethological approach incorporates the practices of guarding with the traditional ways of observing the animals, as one element of the system. The understanding of "co-produced" behaviour in the relationships between herd, territory and shepherd, then notably involves the exploration of the shepherds' empirical observations and knowledge (e.g., stance of the ethologist Thelma Rowell described by Vinciane Despret (2002)).

In addition, scientific observation and experimentation have specific methodological and instrumental resources. Direct observations of the wolf's nocturnal behaviour with sheep and dogs, using night vision cameras, sometimes contradict the interpretation given by breeders or shepherds to a predatory event ("false positives": impression of attacks contradicted by the observations and "false negatives": absence of detection of an effective attack; interviews). Taking seriously the knowledge and observations of shepherds and herders does not necessarily mean considering them valid or even superior to scientific knowledge, but

⁸ The Institute for Promotion and Research into livestock protection Animals, led by Jean-Marc Landry.

including them in collective processes of production of knowledge should be promoted, giving them greater legitimacy and validity. This requires encouraging and organizing exchanges between actors with different and complementary opportunities for observation.

4. HOW TO DIALOGUE TO ALLEVIATE CONFLICTS WITH AND ABOUT WOLVES

The return of wolves, categorized as "problem animals," can be read as a two-tiered political experience. It involves predators both as the object of an opposition between forms of competing appropriations of territories and as part of a conflict between two species. On this basis, it is necessary to try and understand the socio-ecological determinants of a conflict with the wolves concerning pastoral territories, so that they can subsequently enter into negotiations about them and with them.

The linkage between knowledge, expertise and decision-making on biodiversity involves the possibility of "exploring how to build new worlds to be shared with species other than our own" (Mauz & Blandin, 2014). This exploration concerns territories with their own specificities. The arrival of wolves is not happening on a blank page, but in territories that each have their own history.

The question that society is facing is thus of collective choices regarding mountain areas and more widely rural areas. Twenty-five years after the return of the wolf to France, those in favour of their eradication have mostly disappeared, partly through resignation. On the other hand, some positions have hardened (interviews). With the persistence of conflicts over time, the regulation of the interactions between the presence of wolves and human activities is still as acute.

Two scenarios are theoretically opposed: the separation of space and the sharing of space. The segregation or differentiated management of the territories tends to allow the wolves to colonize certain areas and forbid their presence elsewhere. This scenario has been discarded several times for practical, regulatory, ecological, economic and equality reasons between territories. The maintenance of the presence of wolves in the spaces occupied by human activities therefore requires finding ways to limit confrontations. Assuming that it will never be possible to resolve all the conflicts, reflections are on two levels:

- For conflicts with wolves, taking measures to ensure only marginal attacks on herds,
- For conflicts between human actors concerning wolves, finding forms of social arrangements that keep conflicts below a certain threshold.

4.1. Considering animals as actors

Some authors suggest rethinking the interactions between humans and the environment through a new

Box 6 - The problematic polysemy of negotiation

The emerging debate is structured between two approaches, the foundations of which are philosophical: the first postulates that only humans are able to interact through negotiation, understood here as argued discursive interaction calling for agreements and monitoring of the rules instituted; beings of nature would consequently be strictly incapable of doing so, since they would be determined by a nature "software" that would prevent them from transforming their behaviour. The second approach argues that this dualistic conception stems from a historical heritage of conceptions of nature that deserves to be reconsidered in the light of the joint achievements of cognitive ethology and the anthropology of nature (other cultures demonstrating constant and original forms of "negotiations" with the nonhuman living). "Negotiation" is then to be understood, not as a rational dialogue, but as an interaction which amounts to signifying by messages, which make sense in the code of communication of the living, for example limits or prohibitions, taking note of the inductive intelligence of the animal, its ability to learn from experience, in order to modulate the collective behaviours of animals. This approach is based on the ethical phenomena of territoriality, where different signs, potentially associated with agonistic behaviours between packs or between species, actually manage to send messages that modulate the behaviour of packs, and that this approach can be interpreted as nonhuman forms of negotiation of the use of territories (Morizot, 2016).

concept - the anthropocene⁹ - that is debated within the scientific community. Through this term, they propose the necessity to recognise the generalized impact of human activities on the planet. For them, this context invites us to abandon the notion of nature, understood as a pure, timeless entity external to man, and to give preference to the concept of wildlife, which insists instead on the processes of transformation and hybridisation around us and among us (Lorimer, 2015). It is no longer a question of considering species that confront each other but of behaviours, interactions, territorialisations.

Since the 1990s, a theoretical field has also gradually been established around the expression "politics of nature". In the philosophical sense, this refers to the idea that politics is no longer done, and has never been done outside or by means of a nature external to the human, but with multiple non-humans: animals, plants, environments, infrastructures, information flows, even supernatural entities in other contexts... (Beck, 2001, Descola, Latour 1999). In this approach, animals move from "the stage of a resource whose sharing is debated to that of actors with whom participation is negotiated within the city" (Lestel, 2000, p.2). For some authors, this leads to wonder about the conditions and methods of concretely establishing a political negotiation with the wolves (Doré, 2011, cf. Box 6). However, wolves have something specific "to say"; their recolonisation translates a decrease in the influence of human activities on certain areas (Morizot, 2016). It is therefore around this tension that the negotiation should take place. Failing to be able to put an end to conflicts, it would be necessary to find the conditions for a sharing of space and resources with a lesser degree of conflict that is constantly negotiated (see Box 6). It should be noted, however, that the idea of a negotiation with the wolves left a number of interviewees, who uphold very different positions on other points, sceptical. The possibility of establishing a sort of contract with the wolves, albeit virtual, seems to them a fanciful notion and they consider that it is between human beings that negotiation can and must take place.

⁹ This term describes the unprecedented technical power reached by humans identifying it with a geological force. It encourages a re-examination of the orientations of nature conservation policies with regard to the major and ever-increasing impact of human activities on life on the surface of the planet.

Social Science and Behaviour

To consider this question in the diverse situations where it occurs, it is necessary to be able to envisage animals other than as the interchangeable representatives of a species considered as a homogeneous whole. However, the overall study of the relations between humans and animals poses methodological and epistemological problems that have been addressed, among others, by ethnobiology, the anthropology of nature and ethology.

The demographic approach, predominant in contemporary ecology, represents animal individuals over-determined by biology and instinct, described as entities driven by the principles of reproduction and survival. In addition to this approach, social science-inspired ethology approaches animal behaviour by studying individuals in their particular history, in space and time (Despret 2002, Renck & Servais 2002 Servais 2016), and how they behave socially and collectively. The importance of seriously considering the complexity of animal intelligence and the diversity of inter-individual behaviour has been emphasized for a long time (*ibid.*). If some large animals (monkeys, elephants, bears etc.) are studied today from this perspective, it is still not often the case with wolves. The social sciences of wolves, however, are also being constructed, recognizing these animals' individuality and intentions (Morizot, 2016, p.139 et seq.)

Recounting the interactions between humans and animals, whether or not in a process of domestication, requires being in contact with these interactions through active participation (Ingold, 2000). Relations between shepherds and sheep were described as a constant conversation, involving reciprocal learning and respect. These relationships create coherence, sensory continuity, a "way of living in the world" (Despret & Meuret, 2016a). How do wolves become part of these relationships and transform them? The fact is that they are not the only ones involved. Indeed, wolves, wild ungulates, domestic herds, dogs, shepherds and their helpers are caught in complex relationships where the behaviour of each one depends on and is constructed in relation to the behaviour of the others. Garde and Meuret (2017) report a number of observations following attacks by wolves: cows becoming aggressive towards dogs, and even towards humans, wildlife finding refuge in dwellings. The immediate impact of this recent report requires these observations to be put into perspective with complementary approaches (interviews).

The behaviour of wolves must be studied both at the level of the individual and at the level of the pack. Each pack develops hunting preferences, which can be described as hunting cultures in relation to the high learning abilities of these animals (De Waal, 2013; Morizot, 2016, pp. 133 et seq.), but this question of cultures specific to the animal world is disputed by some authors (Digard, 2012). Going further, from the management point of view, the relevant level is at the crossroads between ecological entities and pastoral landscapes: the same pack may encounter different farming systems, but also populations of wild ungulates with contrasting reactions. Wild ungulates, which in their absence have lost predatory avoidance responses (Bonnot *et al.*, 2016), appear as naive prey in zones colonised by wolves, before recovering their avoidance behaviour by increasing their vigilance and avoiding the most exposed areas. This is the notion of "landscape of fear" (Laundré *et al.*, 2010). This adaptation probably favours predation towards flocks - and may help explain the increase in attacks on domestic herds in certain areas compared to the increase in numbers of wolves (interviews, Garde & Meuret, 2017). The sheep themselves, confronted with the predator, tend to avoid areas where attacks have taken place.

Reciprocal learning and limiting confrontations

In the long term, conflicts between humans and wolves have to do with the behavioural plasticity of wolves and their abundance (up to a certain period of time) necessarily involved frequent contact and strong competition. In fact, wolves currently almost all live in contact with humans (Fritts *et al.*, 2003). The

identification of wolves in areas devoid of all human presence and influence, which is reflected in the expression "wilderness" in North America (Nash, 1967, Larrère, 1997, Roué, 2006, Larrère & Larrère, 2015), is in fact the result of their eradication in all inhabited areas. Today, spontaneous colonisation and reintroduction and conservation measures bring wolves back into contact with humans (Lescureux & Linnell, 2010b).

Based on field data collected in Kyrgyzstan, Lescureux (2006, 2007) shows that the relationship between humans and wolves takes the form of long-term coexistence, a "neighbourhood" within which human actions influence the wolves' behaviour and vice versa. These investigations lead to a global and dialectical study of the relations between humans and wolves, which account for the reciprocal influences that constitute them. It is therefore necessary to situate the reflection beyond parallel and disconnected approaches between ecology and social sciences.

At the end of an assessment of the ecological and cultural variations in the evolution of relations between humans and wolves, Boitani (1995, p.11) concludes that conflicts are "better controlled by a durable association between the two species, allowing them to learn from one another and find a compromise." Nevertheless, this long-term frequentation is not sufficient to establish a serene relationship (Lescureux & Linnell, 2010a, Lescureux *et al.*, 2011). The behaviour of the animals - conceived as dynamic and adaptable - influences local perceptions of them.

In this respect, a recent study, based on testimonies from residents, breeders and hunters, presents a hypothesis that there is a change in lupine behaviour in France, according to which wolves are no longer afraid, would openly approach dwellings and attack domestic animals (Garde & Meuret, 2017).

Diverting wolves from flocks

The management of wolf populations by the elimination of certain individuals has been widely advocated since the early 2000s by researchers close to the pastoral environment but also evoked at that time by biologists whose primary objective is the long term viability of the population (Mech, 1995; Mech & Boitani, 2003). The interest of removing problem individuals was examined to regulate populations of large carnivores (Linnell *et al.*, 1999). These are the animals considered to be ones that regularly or preferentially attack domestic herds rather than wild prey, especially if they kill more than they eat (see below "surplus killing").

"Surplus killing" - killing more prey than can be eaten in one meal - is not the product of deviant individuals but a product of natural selection. Although uncommon, this phenomenon exists in the relationships between predators and wild prey (Kruuk, 1972, Miller *et al.*, 1985, DelGiudice, 1998) and may even be a particular strategy of consuming only the most nutritious parts (Zimmerman *et al.*, 2015). Domestic animals, concentrated in large numbers in one place and even confined in an enclosure, having often lost the appropriate behaviour when faced with predators (escape and then return to calm) are more exposed to surplus killing, their continuous movements triggering again the pursuit and attack of wolves (Linnell *et al.*, 1999).

If recurring predation on herds requires the development of specialized behaviour, Linnell and his colleagues hypothesize that whatever the species of large carnivore, most individuals will at least sporadically attack domestic herds if they have the opportunity (Linnell *et al.*, 1999, interviews). However, in some areas, wolves regularly pass close to herds (cattle) without ever attacking (Chavez & Gese, 2006).

Coexistence with animals such as wolves that are likely to hamper human activities implies the possibility of controlling the extent of this damage by actions on the populations or behaviour of these animals (Lescureux

& Linnell, 2010b). The possibilities of controlling animals in relation to the damage they cause to human activities determine a certain degree of reciprocity (Lescureux, 2007; Lescureux & Linnell, 2010b). This degree of reciprocity is not seen solely from the symbolic point of view of the right of reply (Bobbé, 1993), but also in terms of establishing a balanced relationship and respecting a certain distance (Alleau, 2011). This includes finding the conditions for a balanced relationship with predators, as an alternative to their destruction. To do so, it is necessary that a dialogue can take place through actors located "on the borderline" between these existing worlds. Here, in the case of an animal, there must be actors capable of speaking a language that wolves can understand (Morizot, 2016).

Teaching wolves to keep their distance from herds requires associating the herd's attack with a greater risk than the potential gain from the attack. If this risk is sufficiently high, it will be better for wolves to rely on wild prey, which is more difficult to locate and catch but associated with less danger.

This is based on three assumptions:

- The human ability to understand wolves well enough to be able to produce intelligible messages for them,
- The existence in wolves of "hunting cultures", which are transmitted within the packs,
- And / or counter-selection at the genetic level of wolves or packs that underestimate the risks associated with herd attacks.

This involves a better knowledge of the ethology of wolves in its subtle, qualitative dimension, considered in a relational and contextual perspective - considering social interactions within packs, behaviours involving dogs, wild ungulates and sheep, defence infrastructures such as fencing, reaction to shootings and, more generally, behaviour towards humans. Such work is based on the knowledge and know-how of the actors involved in relations with wolves (Lescureux, 2006) as well as functional studies conducted at the micro-local level (Wooding, 2004, Plisson, 2011, Landry, 2013).

There are at least two options for influencing wolf behaviour:

- Actions of influence - means of defence which adopt a language comprehensible to wolves, based on the common areas of our ethograms, i.e. on what we share from the behavioural point of view (examples: olfactory barriers, scaring systems). An argument against these methods is that it is very complicated to deceive wolves in a sustainable way. A parry would consist in associating the scaring systems with specific markings on the herds which they could memorise (IPRA, 2014, analysis adopted by Morizot, 2016, pp. 97 *et seq.*). Another criticism of some of these methods is related to the potential technicality of pastoral farming, certain reservations and the costs that could be associated with it (interviews).
- Controlling numbers by harvesting - shootings are put forward as an active herd protection tool, which can only be effective if targeting threatening individuals preventively, in combination with high tech surveillance devices and good information circulation networks involving breeders, shepherds, trackers, dogs, wolf hunters, trappers etc., and associating naturalist knowledge and know-how (Vincent, 2014). Harvesting represents here part of a reciprocal learning process.

4.2. Identifying conflictuality thresholds

Violence revealing deep tensions

The presence of certain predatory species in a territory, their exclusion from the category of pest, and their inclusion in the protected species category is experienced as a political experience because it refers to "the imposition of a new "norm" of the natural by the State "(Raison du Cleuziou, 2007, p.157). The animals in question are from this point of view perceived as representatives or emissaries of government officials who favour their presence. This confrontation, involving public institutions, is based on multiple and superimposed tensions (see § 3.1). These involve relationships of domination, the questioning of practices related to environmental protection being perceived as affecting the way of life (Dahlström, 2009).

Conflicts concerning wolves, which are particularly exacerbated, tend to harden over time and this needs to be clarified. These conflicts can generate a form of overinvestment, with the idea that "one will have won everything" or "lost everything" if the wolves manage to settle. Conflicts around wolves can sometimes take an extreme turn with acts of violence on property and people. Beyond the animals themselves, the targeted persons are held responsible for the presence of the wolves and the damage they cause (violent demonstrations, poached trophies being exhibited, barns burned down, sequestrations, death threats etc.). Besides the economic losses, the psychological distress of breeders and shepherds facing predation, which can actually lead to severe depression, is also highlighted. Several interviewees mentioned a risk of suicide among the most exposed and most vulnerable professionals. More generally, for their opponents, the presence of wolves appears to be an element to be mastered in the face of rapid uncertainties and changes (political, economic and social). At the same time for their protectors, they are invested with a strong symbolic value as an emissary of the wild and a way to fight against the decline of biodiversity. They thus seem to offer positions and actions to the various protagonists in a context of great uncertainty, in a paradoxical way given the difficulties involved in their "management".

The productivity of conflict and the shift to violence

Classical studies in anthropology and sociology have established that conflicts are, in general, a form of social relationship in their own right and relatively common. This work underlines the possible forms of a "productivity of conflict", whether social, cognitive or political. This hypothesis did not appear clearly during the interviews (hypothesis tested in question 5: "What positive or negative elements have disagreements (discussions, concrete situations) been able to raise? Under what conditions?") In order to contribute to the debate, the following lines put forward a framework for analysing the conflict between humans and wolves through the prism of this framework of interpretation.

From the social productivity point of view, conflicts act as agents of transformation, allowing the actors to express their positions and redefine them within a power struggle (Simmel, 1992 [1908]). As such, they maintain relations, avoid their breakdown, as long as they remain below a certain threshold of expressed violence (whether towards people or towards animals). In the case of the return of wolves to France, the interviews all focused on the negative aspects of the conflicts, the difficulties and the tensions that they engendered. For some, the arrival of the wolves has upset a dynamic, threatening the efforts made to redeploy pastoralism in areas in decline and strengthen its environmental function and its role in local development. For others, it is the destructive, destabilizing, and deleterious aspect of the conflicts that first comes to mind.

From the point of view of cognitive productivity, while conflicts around wolves are widely seen as a failure of management, twenty-five years of conflict have also allowed, albeit by obligation, lessons to be learnt and the emergence of know-how regarding experiments around the protection of domestic herds as well as local

mediation. Some interviewees consider that these experiments have shown their limits; others feel that not all avenues have been explored and that learning needs to be pursued with increased means.

Finally, the existence of a political productivity of conflicts can be advanced insofar as they can offer opportunities for people to speak out, leading to a reconfiguration of social hierarchies (see, for example, Manceron, 2006). In the present case, if the debate remains highly polarized, it is caught up in a web of complex relationships where positions and power relations evolve between and within each of the groups of players. Several options have been put forward: the political visibility of sheep pastoralism, already undergoing fundamental changes before the return of wolves, has tended to increase, as the government is taking into account its socio-economic difficulties. The presence of the wolves would also help to reconfigure the power relations in the pastoral world by giving shepherds renewed visibility to the public eye.

Examining the conflicts surrounding the return of wolves to France shows that they have led to a series of transformations, through constraints leading to a series of adaptations. The problem to be solved, viewed from this angle, would not therefore lie in the existence or absence of conflicts, which seem inevitable, but in the identification of the thresholds beyond which these conflicts retain only their negative dimension, and may lead to violent actions. Following the hypothesis that violence is a last resort in the absence of any room for manoeuvre and negotiation, it is important to understand on a case-by-case basis the reason for violence towards animals or people, to what feeling of imbalance and helplessness it refers. Whether looking at social conflicts caused by the presence of large predators or at conflicts between certain social actors and large predators, the place of violence and the driving forces behind its expression obey a similar logic.

Violence between humans can be seen as a legitimate response to symbolic, political, and economic violence to which they are subjected. Violence against animals, involving poaching, has been described as a political gesture, in response to tensions with the State that is seen to impose a way of managing the territory, thus annihilating another way of living together on a territory, anchored in a culture and a long history (Reason of Cleuziou, 2007, Manceron, 2009, Dahlström, 2009). It is also seen as a retaliatory measure against predators where the government has for a long time ignored their capacity for nuisance and adaptation and which should be contained. In Spain, poaching and poisoning, referred to as a "secret de polichinelle" i.e. a secret everyone knows about, are seen as one of the factors allowing adjustments to be made, in combination with tolerance by some of the players of the losses due to wolves (Bonnet & Benhammou, 2004). In Sweden, on the contrary, opposition to the presence of wolves results in a public condoning of poaching (Dahlström, 2009). Poaching of wolves can also be analysed as a response to the lack of local mediation and recognition of the difficulties encountered by local players (Mounet, 2007). In France, the public exhibition of wolf corpses has also been used as a tool of intimidation. It is reminiscent of the time when wolves were considered harmful and their dead bodies were exhibited in villages, and when their killer received not only social recognition but also money (De Beaulieu, 2004).

Analysis of conflicts with large fauna in different contexts shows that they are largely recurrent and persistent in time (Knight, 2000). It is therefore necessary to find ways to achieve an acceptable relationship for all, which requires permanent adjustments to the identification of thresholds and the means to be implemented in order not to exceed them.

Nevertheless, whereas in an interpersonal relationship of power in which each person can express his demands verbally or legally and prove to the other that he takes his interests into account, the situation is remarkably complicated by the presence of multiple power relationships in which the government also intervenes. Consequently, the proposed analysis should be based on a typology of conflicts, coupled with an analysis of the factors that enable good governance.

From the search for consensus to the way in which disagreements are expressed

It seems clear that conflicts are becoming more tense particularly because the framework of discussion is only on a large scale / Conflicts seem clearly tense especially since the framing of the dialogue is only on a large scale. The predominance of generic postures used at this level to signal and reinforce its membership of one camp leads this level to exclude *a priori* the arguments coming from outside (Mounet, 2012, p.85).

Studies carried out in other contexts have shown the importance of explaining the motivations associated with the conservation of large predators. Thus according to Linnell *et al.* (2000) - from a study in a boreal context - the conservation of large carnivores is difficult to justify for ecological reasons under the usual umbrella species, cornerstone or banner labels, justifications that can actually fuel conflicts and controversies involving these species¹⁰. The authors therefore recommend that these environmental policies publicly build on the true philosophical and ethical motives behind the desire to protect large carnivores in programmes that focus on resolving conflicts involving large predators, and not associate them with programmes of more general conservation of the natural environments. Going further, specifically concerning the wolf, in the Macedonian case, it has been shown that the conservation of wolves could be detrimental to that of bears and lynxes if they were associated with them. (Lescureux & Linnell, 2010a).

Quantitative studies of public attitudes towards wolves in North America and Scandinavia show stronger opposition among rural people, especially in the agricultural world (Karlsson *et al.*, 1999). Geographical distance also plays a role, as people are more likely to be in favour of wolves if they live far away from the territories they occupy (Karlsson & Sjöström 2007; Williams *et al.*, 2002).

Concerning the effect of the governance arrangements put in place, the comparative analysis of several European contexts (Galicia (Spain), Portugal, Germany and Sweden) also provides lessons. The arrangements found in the case of disputes follow more formal procedures in the countries of the North (Germany and Sweden), going hand in hand with a greater organization, visibility and political influence of groups opposed to the presence and/or strict protection of wolves. This situation makes the discrepancies between the European framework and its local interpretation all the more obvious - and this is particularly true for Sweden (Stöhr & Coimbra, 2013). The Swedish case, where tensions are particularly acute, shows that conflicts are not necessarily resolved by a major investment in constructing arenas of expression and participation of the actors concerned. Indeed, participatory governance implies the expression of disagreement, a necessary step to eventually find real points of convergence (*ibidem*).

This refers to more general reflections on governance by consensus. Indeed, consensus-based governance models tend to avoid addressing questions about the fundamental values, the paradigms to which actors are attached. For some authors, it is essential that discussions on environmental management also address these issues in a way that clarifies the under-base of conflicts at work. This explanation appears as an important source of learning (Wals *et al.*, 2009, p.28). It thus forms one of the prisms of the "integrative approach" to socio-ecological issues developed in the context of the involvement of the social sciences in long-term ecological research sites (LTER): values and evaluation, procedure and governance, power and inequality (Hirsch *et al.*, 2013).

¹⁰ The arguments are as follows: (i) large carnivores can hardly play the role of "standard bearer" in view of the negative perceptions to which they are associated; (ii) they survive well in degraded ecosystems such as industrial forests and therefore can not be described as umbrella species in this context; (iii) their cornerstone function applies to their ability to regulate populations of large ungulates, which places them in competition with hunters.

Debates also concerning the terms of the relationship

Different terms are used in the literature and debates surrounding the conflict: cohabitation, coexistence, interexistence, avoidance, reciprocity, compensation, rebalancing, co-adaptation, communication. The use of terms and the way they are received, identifying the actors with one camp or another, contribute to nurturing the disagreements.

It has not been possible in this study to deepen all the discussions at stake, both conceptually and from the point of view of the different positions of the actors on the ground on this subject. It therefore deserves to be studied further. The different words that designate what we do together or not with the wolves refer to different forms of interactions, assuming or not their reciprocal or conflicting dimension. Discussions about these terms call for a distinction between state and process, and more precisely between what relates to an existing situation (endured or chosen), a horizon to be attained (which can itself be debated), or finally of a process in progress or still to be initiated.

The term cohabitation - in its usual sense - establishes the sharing of the same space and the same resources and has the benefit of integrating the territorialized dimension of the relationship. The postulate of a necessarily voluntary dimension of cohabitation can be debated. The battle horse of a certain number of actors, it is also the object of a more or less marked rejection, linked to the fact that the term refers to a form of injunction, badly perceived by those involved with pastoralism. Indeed, if cohabitation refers to the sharing of space and resources, and if resources refer to ewes, breeders are by definition not inclined to share them. However, another approach is to use a more comprehensive set of resources: the whole of the plant biomass that feeds both ewes and wild ungulates. From this point of view, the sharing of resources does not necessarily imply in theory that domestic animals are consumed by wild carnivores, even though in actual fact this is currently the case. As far as wild prey is concerned, its management also raises the question of competition with hunters.

The term coexistence has been used intensively in English-speaking conservationist literature to define the objective of a number of protective and compensatory measures. For other actors, who do not have this objective, coexistence refers to an unwanted state of affairs.

Criticisms of the two terms, cohabitation and coexistence, are based, firstly, on their use by the world of conservation and secondly, on two arguments: (i) a lack of evidence of the dynamic dimension of interactions between humans and wolves; (ii) a lack of reciprocity in the relationship, resulting in a permanent obligation of livestock to adapt to the return or development of the animal. Going further, some even reject the term relationship between wolves and humans, evoking instead, interactions - a more neutral term - or reciprocal indifference (interviews).

The term "interexistence" has also been used to emphasize the importance of clarifying social and ecological interdependencies in the negotiations surrounding conflicts around the presence of wolves (Mathevet, 2012, Chandelier *et al.*, 2016).

The ways of dealing with the presence of predators involve particular relational schemes, such as avoidance or reciprocity (Lescureux, 2007). Compensation and rebalancing are also mentioned, terms which refer to dynamics that are both material and symbolic.

The term co-adaptation refers to a reciprocal and prolonged process of cross-learning. It refers more distantly to the processes of co-evolution over a very long term. We must then consider the conflictual dimension of this co-adaptation, with the aim of limiting its intensity. This term, which is new in the scientific sphere, must still be fully discussed in the same way as the terms coexistence and cohabitation. It is particularly highlighted in the network of researchers known as "Co-adapt" (Co-adaptation between

predators and humans in their territories) in reaction to what is considered an excessive focus on adapting livestock systems to wolves. It underlines the fact that wolves are inventive, so they can and must also adapt to human activities. This is a practical normative recommendation that emphasizes the historical process of reciprocal adjustment, linked to long-term experimentation, based on the existence of interspecific communication.

The term communication is also used insofar as the exchange of information between humans and wolves exists, in direct but also indirect form - through the use of signs/indicators or even dogs. According to this logic, conflicts concerning wolves are partly the result of misunderstandings based on the "inability to interpret ethos, communicate in a common code, develop adapted modes of interaction" (Morizot, 2015). It is therefore a question, using all the available means, of endeavouring to better decode lupine practices concerning predation and the use of a territory by wolves.

The debates around these terms, on which no-one can agree, invite us to note the fact that living with wolves or dealing with wolves is tantamount to accepting in the long term a complicated, evolutionary situation on which we must indefinitely reflect, intervene, invest resources, and experiment. For example, the idea of achieving a sufficiently peaceful cohabitation / coexistence by co-adaptation does not mean reaching a definitive *modus vivendi*, but the transition from a situation where cohabitation / coexistence seems impossible to a situation that remains below a certain threshold of conflictuality, enabling each to have their own territory on shared areas (between men and with the animals).

5. RECOMMENDATIONS

Reflect collectively on the future of rural territories

The return of the wolves reinforces the need to update the debate on the future of rural territories, with two scenarios: first, a "land sparing" scenario, characterized by a segmentation between territories devoted to intensive occupation and farming and territories dedicated to nature and biodiversity; second, a "land sharing" scenario, less "natural habitat conserving", characterized by the presence of extensive human and particularly agricultural activities on all the territories.

- (1) **Organize a substantive debate from local level to national level on the future of rural territories in decline; prepare a summit of rural territories.**

Understand the plurality of contexts and situations

It is important **to pass from the singular to the plural**: wolves, landscapes, tourists, etc. Territories must be understood in all their diversity and complexity in order to grasp the problems and the solutions *in situ*.

- (2) **Think of human and non-human "actors" in their diversity and plurality.**
- (3) **Take into account the temporal dimension and have a diachronic reading of the contexts:** various ways of destroying wolves in the past according to the territories, the way in which wolves arrived in each territory, a long history of local relations with government.
- (4) **Take into account the diversity of contexts and situations in order to reflect on differentiated (depending on the situations) and adaptive management (taking into account the dynamic and evolving nature of these situations), while maintaining a principle of territorial equity (different from zoning).**
 - a- **Take into account the spatial dimension and have a multi-scalar reading of situations:** diversity of decision and management scales (European, national, regional, departmental, local, micro local, individual).
 - b- **Consider the singularities of the protected natural spaces.**
 - c- **Take into account all the dimensions of the problems addressed: technical, economic, sociological, ethological, ecological, ethical etc.**

Acquire and develop knowledge and know-how through observation and experimentation

Knowledge must be taken in its entirety - all knowledge, expertise and management skills being closely linked and nourishing each other - and in their diversity - scientific, technical and / or managerial knowledge and diverse local knowledge. The acquisition of this knowledge must necessarily **involve a multidisciplinary and interdisciplinary approach** (within the scientific sphere) and **a transdisciplinary approach in the context of exchanges** between scientific, technical and local knowledge.

(5) Pluralise research and diversify the organizations involved to stimulate and strengthen the debate and promote independent scientific production.

(6) Promote and develop research at the boundaries of disciplines or call for interdisciplinary collaborations: an ethno-ethological approach, mediation issues, interspecific communication, multidimensional nature of problems (cognitive, technical, emotional, interactional (relations between actors), environmental justice etc.

(7) Promote co-construction of knowledge, for example within local groups, in a logic of interdisciplinarity (between scientific disciplines), transdisciplinarity (between local, scientific and technical knowledge) and intersectorality (between government services).

(8) Promote and develop research in humanities and social sciences.

a- Understand the genealogy of controversies (historical and political approaches to the articulations of major narratives and influences at different scales), understand the social complexity of territories and the diversity of perceptions and representations, understand blocking situations (an anthropological and sociological approach) etc.

b- Involve the social sciences in the development of wolf research programmes to avoid the compartmentalisation of approaches and to study the social effects and issues of these programmes.

The acquisition of knowledge **is inseparable from field experiments on measures to protect herds (dogs, shepherds' assistants, fencing, shooting etc.) and on the harvesting of wolves, to be conducted in parallel.**

(9) Promote and develop field research in ethology to better understand the individual and collective behaviour of wolves in France, of various domestic animals (fear, avoidance, other behavioural changes, etc.), of different types of dogs, and understand the interactions between all the species involved (wolves, dogs, sheep, goats, bovines, wild ungulates, etc.).

a- Relaunch a predator-prey programme extended to domestic animals which will include a sociological and communication section.

b- Develop action-research programmes on protection dogs: identification of dogs used, training techniques, evaluation process, selection, training of breeders and shepherds on the introduction of protection dogs in herds, study of the impacts on tourism, local population and wildlife.

c- Promote action-research programmes to test and evaluate innovative protective or proactive measures to limit predation on flocks.

(10) Support research on pastoralism, developing it beyond its historical scope and promoting multidisciplinary and interdisciplinary approaches, in particular on the types of technical programmes (allocation for example) that require specific proactive and preventive experimentation in territories where the presence of wolves is confirmed.

(11) Promote and possibly update national surveys on the knowledge of and attitudes towards large carnivores.

(12) Develop action-research programmes on shootings: the role and effectiveness of different types of shooting, reflections on the concept of measured and selective shooting, technical feasibility, study of the biological and sociological effects of shooting, learning and

accumulation of knowledge (know-how and soft skills) of the shooters (how to track, be a wolf hunter, role of the specially trained dogs).

- (13) **Evaluate the effectiveness of the protection and action measures (dogs, shepherds' assistants, fences, shooting etc.) *vis-à-vis* the wolves in the long term.**
- (14) **Imagine the wolves' predatory "hot spots" as possible places for experimentation,** because they represent unique situations where rapid action is required (responding to the needs of the victims and helping the most vulnerable herds at a given time) and provide opportunities for learning. These "hot spots" are by nature mobile in space and time.

Improve transparency and the communication of information and data

The question of transparency and the circulation of information and data relating to the return of wolves to France is in line with on the one hand, the considerations of the **Aarhus Convention** on access to information, public participation in decision-making and access to justice in environmental matters and on the other hand, the **INSPIRE Directive**, which aims to promote the availability of geographical information (availability, quality, organization, accessibility) using infrastructures specific to the Member States of the European Union open to decision-makers and citizens.

- (15) **Better inform the general public on the complexity of the questions concerning the presence of wolves in France,** in all their dimensions, notably on the realities of the professional activities involved and on the issues of conservation of biodiversity.
- (16) **Make available and update existing databases and create complementary databases** (which can be thought of as a single database or at least as interoperable databases) initially on a national scale, **then at European level.**
 - a- **Improve access to existing databases such as the Géoloup database.**
 - b- **Create a database making public and accessible all the academic publications and reports produced on the subject from whatever origin** (output generating from protected areas, academic PhD theses or dissertations, reports on public or parapublic structures, etc.).
 - c- **Create a database of observations of interactions between and among animals,** these observations coming from all the players on the territory, presupposing the definition of specific modes of administration of evidence and validation of observations in accordance with the rules of the CNIL.
- (17) **Improve the sharing of experiences (and their transfer from the local to national level)** on the assumption that the solutions must be adapted to each situation and are not directly transposable. The above-mentioned database (see 16 c) may be a means of disseminating the know-how acquired in the field in the experiments referred to in the previous section on herd protection and intervention on wolves (tracking, shooting).
- (18) **Strengthen and multiply the thematic workshops on the ground so that they constitute spaces for interprofessional and intersectoral exchanges and consultation.**

- (19) Develop communication tools, especially in mountain pastures, so that the players in the field can circulate the information quickly and help to create or strengthen social links locally (e.g. radio).

Promote mediation

Whether thinking collectively about the future of rural territories, promoting transdisciplinarity or facilitating the flow of information, the question of **mediation becomes central** to overcoming certain attitudes or tensions in order to accept the different points of view within the same sector and thus **create the conditions for a dialogue**.

- (20) Conduct a systematic review and evaluation of existing local mediation schemes (from local to European level).
- (21) Appoint mediators from local to national levels, based on the model of public advocates or mediators in companies. These mediators, acting on an ad hoc or long-term basis, and if possible salaried, should be appointed not on the basis of their institutional status but on their capacity to act and to be a force for proposal and conciliation. Their legitimacy to intervene in conflicts concerning wolves should be recognized by all the players involved.
- (22) Create a mediator training programme, which will have to address in particular the methods specific to managing conflicts or concepts such as objectivity, neutrality, the responsibility of speaking in public.
- (23) Organize workshops to allow mediators to share experiences
- (24) Encourage exchanges between local actors, in particular with government officials, by allowing them to have an effective administrative presence on the ground (their administrative workload possibly limiting their availability), notably to establish or recreate a climate of confidence and a habit of working together.

Facilitate the anticipation of the return of wolves

The economic and technical consequences of the implementation of protective measures often lead livestock farmers and government officials to wait to be faced with predation before taking these measures. To counter this rationality of the wait-and-see attitude, the logic of **anticipating the arrival of wolves** on the new fronts of colonisation should, on the contrary, be privileged.

- (25) Revisit and possibly update studies evaluating the technical and financial constraints linked to the implementation of protective means adapted to the different livestock systems (beyond the plains-mountains separation).
- (26) Analyse the organisation of pastoral farming services in different regions; plan their creation or reinforcement, in order to be able to establish diagnoses of vulnerability of territories potentially colonisable by the wolves.
- (27) Identify measures that can be easily implemented (the most effective and least burdensome) before the arrival of the wolves to avoid the "initial shock" and deal with the passage of dispersing wolves.

- (28) Encourage local experimentation with protective measures and proactive measures (lethal or non-lethal) to prevent wolves from adopting "bad habits" when colonising new territories.
- (29) Implement mediation, information flows, meetings of local players in territories potentially colonisable, so as to anticipate how to work together and share experiences between territories. Field study trips in France and abroad open to all the actors involved can contribute to this.
- (30) Foster the interest of the research community, in all disciplines, in matters relating to the future of rural areas, pastoral issues, human-animal interactions (including wolves) competing for resources and territories, to both multiply the scientific approaches and guarantee the permanence and independence of a scientific community over the long term.
- (31) Recognize, despite the urgency and the acuity of the situations, that the work to be carried out (developed throughout these recommendations) necessarily takes place over a long period of time - even if urgent measures can be taken in the "hot -spots "(14) - which will probably have to be prolonged indefinitely.

6. SUMMARY OF THE REPORT

1. FRAMEWORK OF EXPERTISE

This report was commissioned by the State Secretariat for Biodiversity and aims to:

- Produce an inventory of knowledge on the contemporary relations between humans and wolves in France,
- Analyse the positions and representations of the actors concerned,
- If possible, put the French situation in perspective with examples in other countries.

The first part provides information on the organization of the committee (calendar of meetings, interviews, composition of the committee) and on the role of human and social sciences in the study of conflicting relationships between humans and animals. The main disciplines involved are sociology, anthropology, ethnoecology, geography and philosophy.

Warning about the limitations of usage of this report. The short timeframes, the complexity of the issues involved and the amount of information to be processed did not enable all the issues discussed to be explored fully. To fulfil the ambition of the commission, it will be necessary to continue this research in greater depth.

The role of Social and Human sciences in addressing human-animal relationships. Conflicting relationships between humans and animals are widespread. Between competition for the same resources and predation, they give rise to a variety of material and symbolic answers. Their study should be interdisciplinary, especially for large carnivores, given their place in ecosystems, the diversity of socio-ecological contexts in which conservation programmes are included, the intensity and long duration of conflicts surrounding them. Interactions between humans and wolves existed well before the early domestication of wild ungulates and wolves themselves (about 16,000 years ago). Today, they often share the same spaces: wolves adapt their behaviour to humans and influence societies in return (impact on breeding, strong presence in myths). The protection status of wolves in Europe (the Habitats Directive and the Bern Convention) reinforces the interest of social science involvement in the study of relationships between humans and wolves. Addressing conflicts related to the return of wolves to France involves analysing the dynamics of reciprocal adaptations between humans and between human and non-human actors in situations that are always singular. This includes paying attention to conservation as a social phenomenon that is met with other logics of action and also to the discourses of key players about the behaviour of wolves.

2. Outline of a genealogy of controversies

The second part presents five important controversies that have occurred in France since the return of the wolves in the early 1990s. For each controversy, the time and spatial scales, the people involved and their respective arguments are described, as well as the links that are established between these controversies and other existing or past debates. The five controversies analysed are:

- The origin of the return of wolves in France - natural origin or (re) introduction?
- The effective number of wolves - the official estimates of the ONCFS, how these are received by the professional agricultural organizations or hunting associations and the associations for the

- protection of nature,
- The desirable number of wolves and the regulation of populations,
- Shootings - objective, effectiveness and conditions of implementation,
- The impact of wolves on biodiversity - an animal that guarantees the natural nature of habitats versus an animal disrupting an agro-pastoral activity that is beneficial to the environment.

The analysis of these five controversies shows that they are consecutive but more especially, that they accumulate, intermingle, and feed on one another. The emergence of one controversy does not imply the disappearance of others; it may be accompanied by the attenuation of other controversies which will remain buried until they are either taken up again, or will eventually be extinguished. A genealogy of controversies emerges. Their description serves to highlight the complexity of the positions of the various parties involved and the changes they may be subject to.

3. FROM THE GENEALOGY OF CONTROVERSIES TO THE DYNAMIC STUDY OF CONFLICTS: HUMANS AND ANIMALS CAUGHT IN COMPLEX SITUATIONS.

The third part proposes a contextualized and dynamic analysis of the conflicts surrounding the return of wolves in France. It allows these conflicts to be considered by replacing the opposition between pastoral breeding and protection of wolves in a wider reality, involving a series of social players, animals and environments. These players are involved in territorial dynamics in constant reconstruction, where the construction of knowledge plays an important role.

3.1. Territorialising conflict analysis

Four dimensions are addressed successively to define the contours of the territories in which the conflicts take place.

- 1) **Conflicts around the return of wolves form a "new stage" for tensions between pastoralism and protection of nature.** This return (i) complicates the rapprochement between conservation and agro-pastoral issues at a time when agri-environmental measures created the conditions for an exchange; (ii) reveals and accelerates the changes in the agro-pastoral world; (iii) establishes plays of opposition, often binary in appearance, that go beyond the question of the economic damage to the herds and which imply multiple ratios of power: farmers and hunters / naturalists and protectors; urban / rural; experts / laymen. These categories are actively constructed and brought into play strategically by the different players.
- 2) **The interaction between several spatial levels** is then discussed. The special case of protected areas shows how conflicts about wildlife are part of negotiations on the global assessment of the environment in land-use planning. These negotiations link "macro-social" logics (national frameworks and general positions, identification with a particular side) and "microsocials" (arrangements between actors who know one another personally). At this second level, individuals and institutions can act as mediators.
- 3) **Conflicts are a long-term issue.** The new "fronts" colonised by wolves each have a singular history, but recurring patterns appear, notably the lack of anticipation. In the formerly colonised territories, problems persist for several reasons: lack of a common definition of the problem; the question of investment in experimentation to limit the damage sufficiently and sustainably. The

long duration of conflicts results in a process of habituation but also of saturation and can both favour and frustrate the establishment of more integrative approaches to conservation policies.

- 4) **Discussions are also on the symbolic level**, which implies different perceptions of the "good place of wolves" in the landscape. To the blurring of the frontiers between wild and domestic are added the more probing questions of categorization and definition. The involvement of the media in the return of wolves often revolves around certain archetypal figures. Nevertheless, the representations associated with them must be understood in relation to their contextualized behaviour in a set of interactions between species in a given territory.

3.2. The construction of knowledge as an integral part of conflict

The political and social issues of knowledge production are addressed as an integral part of the conflicts. They concern all actors, who re-learn how to know and interact with predators long absent from their territories. The knowledge put into practice by the parties concerned is very diverse and is constructed in a conflictual context. The different types of knowledge are recent, hierarchical, fragmented and compartmentalised, including the scientific knowledge. This paragraph is organized around three points:

- 1) **The role of scientific and technical expertise**, which involves people working on different aspects. The production of knowledge about wolves does not close controversies and helps to shift them. The consensus reached remains provisional and related to the spatial and temporal context.
- 2) **The number of wolves is at the heart of the relations between constructing expertise and the administrative response of the government**. The promotion of a serious quantification exercise, entrusted to the ONCFS, appears to be a way of overcoming the uncertainty and distrust of the various interlocutors. The central scientific legitimacy of the figures, transposed to public action, is however not sufficient to build confidence on the ground.
- 3) **A problem of how to reconcile field experience with scientific research, particularly concerning the protection of herds**, is highlighted. Until now, budgets allocated to scientific research on wolves have mainly gone to monitoring wolf populations. The pooling and development of knowledge remains to be reinforced concerning: field experiments to better understand the behaviour of wolves; the protection of domestic herds and the proactive approach to wolves; mediation between social actors. The "missing topics" involve both scientific research and local knowledge, both on domestic animals and on wild animals.

4. HOW TO ESTABLISH A DIALOGUE TO ALLEVIATE CONFLICTS WITH AND ABOUT WOLVES

The return of wolves, categorized as "problem animals," can be seen as a political experience. It is necessary to understand the socio-ecological determinants of conflicts with these animals in order to negotiate with and about predators. Since the zoning scenario has been ruled out, maintaining the presence of wolves in the spaces occupied by human activities presupposes that confrontations are limited. Accepting the impossibility of definitively resolving conflicts leads us to situate the reflection on two levels:

- For conflicts with wolves, take action on the wolves so that they only attack the herds on a very marginal level.
- For conflicts concerning wolves, find types of social arrangements that keep conflictuality below a certain threshold.

4.1. Consider animals as actors

The social sciences have brought to the study of animal behaviour theoretical and methodological tools to describe the interactions between humans and animals. It is notably a question of how wolves fit into the relational framework that involves shepherds and sheep, dogs, wild ungulates, pastoral environments and all of their users. Lupine behaviour must be analysed at the individual and collective levels. The long-lasting proximity of wolves to humans and their proven behavioural plasticity provide elements to develop new reciprocal learning to limit confrontations (i.e. intervening on populations or their behaviour), taking into account that the behaviour of animals (dynamic and adaptable) influences the way they are perceived locally. Making strategic choices in order to divert wolves from herds involves a precise understanding of predation and means associating the attack of herds with a risk superior to the expectation of gain. This is based on three assumptions: (i) human ability to understand wolves well enough to produce intelligible messages for them, (ii) the existence of hunting preferences transmitted within packs (iii) and / or - genetic counter-selection of wolves or packs that tend to underestimate the risks associated with herd attack. At least two options exist for influencing the behaviour of wolves: (i) influential actions through methods of defence that adopt wolf-understandable language, (ii) control actions by targeted harvesting of threatening/recidivist individuals, in conjunction with precise surveillance devices and good information flow networks.

4.2. Identifying conflictuality thresholds

A violence revealing deep tensions. The inclusion of predators previously classified as harmful in the "protected species" category is a political experiment. It refers to a new norm seen as being imposed by government concerning nature, and questions certain ways of life. This confrontation, involving public institutions, is based on multiple and superimposed tensions. The conflicts exacerbated around the wolves tend to harden over time, due to the position and action statements available to the protagonists:

- For their detractors, wolves become an element to be mastered in a context of uncertainty and rapid change (political, economic and social),
- For their protectors, they have a strong symbolic value and are an emissary of the wild facilitating the fight against the decline of biodiversity.

The productivity of conflicts and the shift towards violence. Classical studies in sociology and anthropology have established that conflicts are a relatively common form of social relationship and highlight three types of "conflict productivity": social, cognitive and political. This hypothesis was not evident in the interviews. The impossibility of putting an end to conflicts should lead to the identification of the thresholds above which these conflicts retain only their negative dimension, leading notably to violent actions. Assuming violence is a last resort in the absence of any room for manoeuvre and negotiation, it is important to understand on a case-by-case basis the purpose of violence against animals (poaching) or people, and to what feeling of asymmetry and powerlessness it refers. In this instance, because of the strong involvement of the authorities, it leads us to reflect on factors that promote good governance.

From the search for consensus to the expression of disagreements. If the main measures and orientations need to be defined at national level for reasons of equity and coherence, the experimentation, in particular mediation, must be carried out at the local level. Conflicts are exacerbated all the more when the dialogue takes place only at levels where the generic positions used to signal and reinforce ones belonging to a particular side predominate. Participatory governance implies the expression of disagreements, which

is a necessary step in the search for real points of convergence. This leads to an explanation of the fundamental values to which the protagonists relate, in a specific way with regard to the species concerned and not for large predators or biodiversity, in general, given the particularities of the status and behaviour of wolves.

Discussions also concerning the terms of the relationship. Several terms are used in the literature and discussions concerning conflicts: cohabitation, coexistence, interexistence, avoidance, reciprocity, compensation, rebalancing, co-adaptation, communication. These different words, which designate what we do together or not with the wolves, refer to different forms of interactions, assuming or not their reciprocal or conflicting dimension. It is necessary to distinguish between state and process, and more precisely between the state of fact (endured or chosen), the horizon to be reached (which can itself be debated) and the process in progress, or still to be initiated.

5. RECOMMENDATIONS

Reflect collectively on the future of rural territories

(1) Organize a substantive debate from a local to national level on the future of rural territories in decline; prepare general assemblies of rural territories.

Understand the plurality of contexts and situations

Switch from singular to plural.

- (2) Consider the human and non-human "actors" in their diversity and plurality.
- (3) Take into account the temporal dimension and interpret the contexts diachronically.
- (4) Take into account the diversity of contexts and situations in order to consider different types of management (depending on the situations) that are also adaptive (taking into account the dynamic and evolving nature of these situations), while maintaining a principle of territorial equity.
 - a- Take into account the spatial dimension and have a multi-scalar interpretation of situations.
 - b- Consider the singularities of the protected natural areas.
 - c- Take into account all the dimensions of the problems addressed: technical, economic, sociological, ethological, ecological, ethical etc.

Acquire and develop knowledge and know-how through observation and experimentation

Adopt a pluri-inter- and transdisciplinary approach in a logic of exchange.

- (5) Pluralize research and diversify the organisations involved to stimulate and strengthen the debate, and promote independent scientific productions.
- (6) Promote and develop research at the boundaries of disciplines or call for interdisciplinary collaborations
- (7) Promote co-construction of knowledge, for example within local units, in a logic of interdisciplinarity (between scientific disciplines), transdisciplinarity (between local, scientific, technical knowledge) and intersectorality (between State departments).
- (8) Promote and develop research in human and social sciences.
 - a- Understand the genealogy of controversies, comprehend the social complexity of territories and the diversity of perceptions and representations, understand situations of blockage.
 - b- Include a sociological part in research programmes on wolves.

Adopt field experiments on the measures of protection of herds (dogs, assistant shepherds, fences etc.) and on the harvesting of wolves, to be conducted in parallel.

- (9) Promote and develop field research in ethology.
 - a- Restart a predator-prey programme extended to domestic animals that has a sociological and communication component.
 - b- Develop action-research programmes on protection dogs.
 - c- Promote action-research programmes to test and evaluate innovative protective or proactive measures to limit predation on flocks.
- (10) Support research on pastoralism, develop it beyond its historical perimeter and promote multi-disciplinary and interdisciplinary approaches.
- (11) Valorise and possibly update national surveys on attitudes towards large carnivores.
- (12) Develop action-research programmes on shooting.
- (13) Evaluate the effectiveness of the protection and action measures (dogs, assistant shepherds, fences, shooting etc.) with regard to wolves over the long term
- (14) Consider the "hot-spots" of predation by wolves as possible places for experimentation.

Improve transparency and communication of information and data

Within the framework of the Aarhus Convention and the INSPIRE Directive:

- (15) Better inform the general public about the complexity of questions concerning the presence of wolves in France.
- (16) Make available and update existing databases and create complementary databases at national and European level.
 - a- Improve access to existing databases.
 - b- Create a database making public and accessible all academic publications and reports produced on the subject from wherever they may come.
 - c- Create a database of observations of interactions between and with animals.
- (17) Improve the sharing of experiences (and passing it on from the local to the national level), the database (16c) being a possible means of disseminating the know-how acquired in the field during the experiments.
- (18) Strengthen and multiply the thematic workshops on the ground so that they constitute spaces for interprofessional and intersectoral exchanges and consultation
- (19) Develop the communication tools, particularly in mountain pastures, so that the actors in the field can circulate the information quickly and help to create or strengthen the social bond locally.

Promote mediation

Mediation becomes a central issue in creating the conditions for dialogue.

- (20) Conduct a systematic review and evaluation of existing local mediation systems.
- (21) Appoint mediators from local to national levels.

- (22) Set up mediation training programmes..
- (23) Organize workshops to allow mediators to share experiences
- (24) Encourage exchanges between local actors, in particular to establish or recreate a climate of trust and a habit of working together.

Help to anticipate the return of wolves

Anticipate the arrival of wolves in new areas of colonisation.

- (25) Revisit and possibly update studies that evaluate the technical and financial constraints of setting up protective measures adapted to the systems of livestock breeding.
- (26) Analyse the organisation of pastoral farming services in different regions; plan their creation or reinforcement, in order to be able to establish diagnoses of vulnerability of territories potentially colonisable by the wolves.
- (27) Identify measures that can easily be put in place before the arrival of wolves to avoid the "first shock" and deal with the passage of dispersing wolves.
- (28) Encourage local experimentation with protective measures to prevent wolves from adopting "bad habits" when colonising new territories.
- (29) Implement mediation, information flows, meetings of local actors in potentially colonisable territories.
- (30) Foster the interest of the research community, in all disciplines, in matters relating to the future of rural areas, pastoral issues, human-animal interactions (including wolves) competing for resources and territories, to both multiply the scientific approaches and guarantee the permanence and independence of a scientific community over the long term.
- (31) Recognise, despite the urgency and acuteness of the situations, that the work to be carried out (developed throughout these recommendations) will inevitably take place over a long period of time and must be pursued indefinitely.

BIBLIOGRAPHY

- Åkerman, M. & Peltola, T., 2002. Temporal scales and environmental knowledge production. *Landscape and urban planning* 61(2), p. 147-156.
- Åkerman, M., Arpin, I., Balian, E., Bunnefeld, N., Nygren, N. V., Palosaari, T. & Thomson, I., 2016. Understanding perpetuated conflicts over animals. *TRACE – Finnish Journal for Human-Animal Studies* 2(1), p. 74-80.
- Akrich, M., Callon, M. & Latour, B., 2006. *Sociologie de la traduction : textes fondateurs*. Presses des MINES.
- Alexandre O. & Mounet C., 2008. La territorialisation à l'épreuve des temps. Mobilisation du temps et des temporalités dans la territorialisation des politiques environnementale. *Cahiers de Géographie du Québec* 52(145), p. 9-26.
- Alleau, J., 2011. *Garder ses distances. Une histoire des relations homme-loup dans les Alpes occidentales (16ème-18ème siècle)*. Thèse de l'Université de Caen-Basse Normandie en histoire des mondes modernes, du monde contemporain. Université de Caen, Caen.
- Alphandéry, P. & Billaud, J.-P. (eds.), 1996. *Études rurales. Cultiver la nature*, n°141-142.
- Alphandéry, P. & Bergues, M., 2004. Territoires en questions : pratiques des lieux, usages d'un mot. *Ethnologie française* 34(1), p. 5-12.
- Audrain-Demey, G., 2016. Le loup : de la protection des troupeaux à la régulation de l'espèce. *Revue juridique de l'environnement* 41(2), p. 234-252.
- Bacha, S., Bataille, J.-F. & Garde, L., 2007. Indemnisation des pertes et évaluation des coûts réels. In L. Garde (coord.) *Loup-Élevage : s'ouvrir à la complexité. Actes du séminaire des 15-16 juin 2006*. Éd. CERPAM, Manosque, p. 150-161.
- Barré, R., Lavoux, T. & Piveteau, V., 2015. *Un demi-siècle d'environnement entre science, politique et prospective*, Versailles Cedex, Éditions Quæ, (Indisciplines).
- Bataille, J.-F., Launay, F., Aussibal, G., Moulin, C.-H., Nozieres, M.-O., Lasseur, J. & Tchakerian, E., 2016. Des scénarios de futurs possibles pour des systèmes d'élevage pastoraux méditerranéens. *Innovations agronomiques* 49, p. 309-325.
- Beck, U., 2001 [1986]. *La société du risque*. Paris : Aubier.
- Benhammou F., 2009. Protéger l'ours et le loup en France : antihumanisme ou coexistence territoriale durable ? *Géographie et Cultures* 69, p. 25-43.
- Benhammou, F. & Salvador, O., 2003. Le loup (*Canis lupus*) dans les Pyrénées, 1998-2003 : cas d'école pour anticiper le retour des prédateurs sauvages dans les territoires ruraux marginaux. *Sud-Ouest Européen* 16, p. 85-93.
- Bennett, E. M. 2017. Changing the agriculture and environment conversation. *Nature Ecology and Evolution* 1, p. 1-2.
- Benson, E. 2010. *Wired wilderness: Technologies of tracking and the making of modern wildlife*. JHU Press.
- Beylier, B., Garde, L., Guende, G., Lasseur, J. & Lécivain, E. 2002. La Mesure Agriculture-Environnement « Biotopes rares et sensibles » du parc du Luberon : un bilan pour le territoire et l'élevage. *Courrier Scientifique du Parc Naturel Régional du Luberon* 6, p. 88-102.

- Blondiaux, L. & Sintomer, Y., 2002. L'impératif délibératif. *Politix* 15(57), p. 17-35.
- Bobbé, S., 1993. Hors statut, point de salut. Ours et loup en Espagne. *Études rurales* 129-130, p. 59-72.
- Bobbé, S., 2000a. Les nouvelles cultures du sauvage ou la quête de l'objet manquant. État de la question. *Ruralia* [En ligne] 07.
- Bobbé, S., 2000b. Un mode de garde écologiquement correct : le chien de protection. *Ethnologie française* XXX(3), p. 459-472.
- Bobbé, S., 2002. Le loup et les recompositions territoriales dans les Alpes françaises. Éléments pour une réflexion sur le projet de zonage. *Espaces et sociétés* 110-111, p. 111-28.
- Bobbé, S., 2004. Gestions faunistiques : cultures des sauvages et brouillage des catégories. *Communications* 76, p. 203-220.
- Boitani, L., 1995. Ecological and Cultural Diversities in the Evolution of Wolf– Human Relationships. In L.N. Carbyn & D.R. Seip (eds) *Ecology and Conservation of Wolves in a Changing World*, Alberta: Canadian Circumpolar Institute. p. 3-11.
- Bonnet, N. & Benhammou, F., 2004. La gestion des grands prédateurs (ours et loups) dans le Parc Naturel et la Réserve MAB de Somiedo (Espagne) : un modèle d'éco-développement ? In Benhammou F. et al. (eds), 2004. *La cohabitation Hommes/ Grands Prédateurs en France (Ours et Loup) : enjeux didactiques pour la conservation de la nature et le développement durable ?* Actes du colloque du 21 et 22 mars 2004, Muséum d'Orléans, Recherche Naturaliste en Région Centre.
- Bonnot, N. C., Morellet, M., Hewison, A. J. M., Martin, J-L., Benhamou, S. & Chamaillé-Jammes, S., 2016. Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) adjust habitat selection and activity rhythm to the absence of predators. *Canadian Journal of Zoology* 94, p. 385-394.
- Brunois, F., Gaunet, F. & Lestel, D., 2006. Étho-ethnologie et ethno-éthologie. *Social Science Information* 45(2), p. 155-177.
- Callon, M., 2006 [1981]. Pour une sociologie des controverses technologiques. In Akrich, M., Callon M, & Latour, B., 2006. *Sociologie de la traduction. Textes fondateurs*, Presses des Mines, p. 135-157.
- Callon, M., Lascoumes, P. & Barthe, Y., 2001. *Agir dans un monde incertain. Essai sur la démocratie technique*. Seuil, Paris.
- Campion-Vincent, V., 2000. Les réactions au retour du loup en France. Une analyse tentant de prendre « des rumeurs » au sérieux. *Anthropozoologica* 32, p. 33-59.
- CDB, 1992, Convention sur la diversité Biologique.
- Chabert J-P., de Sainte Marie C. & Vincent M., 2004. La régularisation du loup : 1990-2004. *Forêt Méditerranéenne* XXV(4), p. 131-142.
- Chandelier, M., Mathevet, R., Steuckardt, A. & Sarale, J.M., 2016. Le loup en tribunes : analyse comparée de deux discours argumentatifs sur une espèce controversée. *Natures Sciences Sociétés* 24, p. 136-146.
- Chavez, A. S. & Gese, E. M., 2006. Landscape use and movements of wolves in relation to livestock in a wildland-agriculture matrix. *Journal of Wildlife Management* 70, p. 1079-1086.
- Ciucci, P., Boitani, L., Francisci, F. & Andreoli, G., 1997. Home range, activity and movements of a wolf pack in Central Italy. *Journal of Zoology* 243, p. 803-819.
- Collomb, G., 2009. Sous les tortues, la plage ? Protection de la nature et production des territoires en Guyane. *Ethnologie française* 39, p. 11-21.

- Dahlström, A.N., 2009. "Shoot, dig, and shut up!" Differing Perceptions of Wolves in Urban and Rural Sweden. *Ethnologie française* 39, p. 101-108.
- Dalla Bernardina, S., 2002. Pourquoi danser avec les loups ? *Le Monde alpin et rhodanien* 30(1-3), p. 73-96.
- De Beaulieu, F., 2004. *Quand on parle du loup en Bretagne*. Brest : éditions le Télégramme
- de Panhol, X., 1969. Le chien de berger : développement et signification géographique d'une technique pastorale. *Bulletin De l'Association des Géographes Français* 370, p. 355-368.
- De Waal, F. 2013. *Le bonobo, Dieu et nous*. Éditions Les liens qui libèrent.
- DelGiudice, G. D., 1998. Surplus Killing of White-Tailed Deer by Wolves in Northcentral Minnesota. *Journal of Mammalogy* 79, p. 227-235.
- Descola, P., 2005. *Par-delà nature et culture*. Paris : Gallimard.
- Despret, V., 2002. *Quand le loup habitera avec l'agneau*. Paris, Les Empêcheurs de penser en rond.
- Despret, V. & Meuret, M. 2016b. *Composer avec les moutons*. Éd. Cardère (Collection Hors les drailles).
- Despret, V. & Meuret, M., 2016a. Cosmoecological sheep and the arts of living on a damaged planet. *Environmental Humanities* 8 (1), p. 24-36.
- Desquilbet, M., Dorin, B. & Couvet, D., 2013. Land sharing ou land sparing pour la biodiversité : Comment les marchés agricoles font la différence. *Innovations agronomiques* 32, p. 377-389.
- Desrosières, A., 2016 [1993]. *La politique des grands nombres: histoire de la raison statistique*. La découverte.
- Deverre, C., 1995. Social implications of agro-environmental policy in France and Europe. *Sociologia ruralis* 35(2), p. 227-247.
- Deverre, C., 1999. Le loup (le retour) et l'agneau (le départ ?). *Le courrier de l'environnement de l'INRA* 36, p. 67-68.
- Didier, E., 2011. L'État néolibéral ment-il ? « Chanstique » et statistiques de police. *Terrain* 57, p. 66-81.
- Digard, J. P., 2012. Le tournant obscurantiste en anthropologie. *L'Homme* 3, p. 555-578.
- Dobremez, L., Nettier, B., Legeard, J. P., Caraguel, B., Garde, L., Vieux, S. & Della-Vedova, M., 2014. Les alpages sentinelles. Un dispositif original pour une nouvelle forme de gouvernance partagée face aux enjeux climatiques. *Revue de géographie alpine* 102(2) [en ligne].
- Doré, A., 2010a. Le devenir politique des corps recomposés : la circulation des animaux dans l'espace public. *Sociologie et sociétés* 42(2), p. 181-204.
- Doré, A., 2010b. L'histoire dans les méandres des publics : quand les « méchants loups » resurgissent du passé. In Moriceau, J-M. & Madeline, P., (Éds.), *Repenser le sauvage grâce au retour du loup. Les sciences humaines interpellées*. Caen : Bibliothèque du Pôle Rural - MRSH-Caen, p. 75-89.
- Doré, A., 2011. *Des loups dans la Cité. Éléments d'écologie pragmatiste*. Thèse de doctorat. Université de Liège, Belgique.
- Doré, A., 2013. L'exercice des biopolitiques. Conditions matérielles et ontologiques de la gestion gouvernementale d'une population animale. *Revue d'Anthropologie des Connaissances* 7 (4), p. 837-855.
- Doré, A., 2014. Faire politique avec les animaux. Négocier avec des loups. *Revue Semestrielle de Droit Animalier* 1, p. 247-255.
- Doré, A., 2015. Attention aux loups ! L'ambivalence de la menace et de sa mesure. *Ethnologie française* 45, p. 45-54.

- Duchamp, C., Chapron, G., Gimenez, O., Robert, A., Sarrazin, F., Beudels-Jamar, R. & Le Maho, Y., 2017. *Expertise collective scientifique sur la viabilité et le devenir de la population de loups en France à long terme* sous la coordination ONCFS-MNHN de : Guinot-Ghemem M., Haffner P., Marboutin É., Rousset G., Savouret-Soubelet A., Siblet J.P., Trudelle L. (par or. alph.).
- Dumez R., Roué M. & Bahuchet, S., 2014. Conservation de la nature : quel rôle pour les sciences sociales ? *Revue d'ethnoécologie* 6, [En ligne].
- Dupont, H., Mihoub, J. B., Becu, N. & Sarrazin, F., 2011. Modelling interactions between scavenger behaviour and farming practices: Impacts on scavenger population and ecosystem service efficiency. *Ecological modelling* 222(4), p. 982-992.
- Émerit, A., 2007. *Les aires protégées gérées. Zonage de l'espace et différenciation des rôles des acteurs conditions d'une gestion intégrée des territoires. Le rôle des équipes des espaces protégés alpins dans la gestion du retour du loup et dans la conservation du tétras-lyre*. Thèse de doctorat, AgroParisTech-Engref.
- Espuno, N., Lequette, B., Poulle, M-L., Migot P. & Lebreton, J-D., 2004. Heterogeneous response to preventive sheep husbandry during wolf recolonization of the French Alps. *Wildlife Society Bulletin* 32, p. 1195-1208.
- Estrosi C. & Spagnou D., 2003. *Rapport fait au nom de la commission d'enquête sur les conditions de la présence du loup en France et l'exercice du pastoralisme dans les zones de montagne*. Tome I – Rapport ; Tome II – Auditions. Documents d'information de l'Assemblée nationale.
- Fagier, M., Marchal, A. & Ambrosini, A., 2014. Le loup est-il une espèce protégée ? *Revue Semestrielle de droit animalier* 1, p. 283 -294.
- Faugère, E., Navarette, M., Charles, M., Etienne, M., Fauriel, J., Lasseur, J., Lécivain, E., Napoléone, M. & Paratte, R., 2010. Connaissances scientifiques en quête de connaissances d'acteurs. *Natures Sciences Sociétés* 18, p. 395-403.
- Fritts, S. H., Stephenson, R. O., Hayes, R. D. & Boitani, L., 2003. Wolves and Humans. In Mech, L.D., & Boitani, L., (eds). *Wolves: behavior, ecology, and conservation*. The University of Chicago Press, Chicago, p. 289-316.
- Garde L., 2002. Loup et forêt méditerranéenne, quelles questions pour l'élevage et la gestion de l'espace ? *Forêt Méditerranéenne* XXIII (1), p. 45-52.
- Garde, L. (coord.), 2007. *Loup–Élevage : s'ouvrir à la complexité*. Actes du séminaire des 15-16 juin 2006. Éd. CERPAM, Manosque
- Garde L., Bataille J-F., Dimanche M., Dumé A., Lapeyronie P., Lasseur J. & Silhol A., 2007a. Protection des troupeaux et gestion pastorale : un compromis souvent difficile pour les exploitations ovines allaitantes des montagnes méditerranéennes françaises. *Rencontres Recherches Ruminants* 14, p. 169-172.
- Garde, L., Bacha, S., Bataille, J-F., Gouty, A-L. & Silhol, A., 2007b. Les éleveurs résidents en zone à loups : perceptions et stratégies. In L. Garde (coord.) *Loup–Élevage : s'ouvrir à la complexité*. Actes du séminaire des 15-16 juin 2006. Éd. CERPAM, Manosque, p. 180-191
- Garde, L. & Meuret, M. 2017. Quand les loups franchissent la lisière : expériences d'éleveurs, chasseurs et autres résidents de Seyne-les-Alpes confrontés aux loups. Rapport de recherche INRA/CERPAM.
- Garde, L., Dimanche, M. & Lasseur, J., 2014. Permanence et mutations de l'élevage pastoral dans les Alpes du Sud. *Revue de Géographie Alpine* 102 (2) [En ligne].
- Gehring, T.M., VerCauteren K. C. & Landry, J-M., 2010. Livestock protection dogs in the 21st Century: Is

- an ancient tool revealing to modern conservation challenges. *Bioscience* 60(4), p. 299-308.
- Granjou, C. & Mauz I., 2009a. Quand l'identité de l'objet-frontière se construit chemin faisant. Le cas de l'estimation de l'effectif de la population de loups en France. *Revue d'Anthropologie des Connaissances* 3(1), p. 29-49.
- Granjou, C. & Mauz, I., 2009b. Les éleveurs et leurs voisins. Etude du renouvellement des rhétoriques professionnelles d'une profession contestée. *Revue d'Études en Agriculture et Environnement* 90 (2), p. 215-235.
- Granjou, C. & Mauz, I., 2012. Des espaces frontières d'expérimentation entre protection de la nature et pastoralisme. *Natures Sciences Sociétés* 20(3), p. 310-317.
- Grandmougin, B., Owen Le Mat, O., Brice Amand, B. et Duprez, C., & Mounet, C., 2010. *Évaluation de l'impact socio-économique du loup sur les systèmes pastoraux dans les Alpes Françaises*. Rapport ACTeon/CEMAGREF.
- Hirsch, P. D., Brosius, J. P., O'Connor, S., Zia, A., Welch-Devine, M., Dammert, J. L., Songorwa, A., Trung, T. C., Rice, J. L., Anderson, Z. R., Hitchner, S., Schelhas, J. & McShane, T.O., 2013. Navigating complex trade-offs in conservation and development: an integrative framework. *Issues in Interdisciplinary Studies* 31, p. 99-122.
- Ingold, T., 2000. Hunting and Gathering as Ways of Perceiving the Environment. In R. Ellen and K. Fukui (eds) *Redefining Nature: Ecology, Culture and Domestication*. Oxford: Berg, p. 117-54.
- IPRA, 2014. *Etude sur les interactions loup-troupeau-chien de protection pour l'amélioration des chiens et systèmes de protection des troupeaux*, Rapport d'activité 2014. Projet CANOVIS 2013-2017.
- Karlsson, J., Bjärvall, A. & Lundvall, A., 1999. *Svenskarnas inställning till varg. En intervjuundersökning*. Rapport 4993. Stockholm, Naturvårdsverket Förlag.
- Karlsson, J. & Sjöström, M., 2007. Human attitudes towards wolves, a matter of distance. *Biological Conservation* 137, p. 610-616.
- Kirk, J. & Miller, M. L., 1986. *Reliability and validity in qualitative research*. SAGE.
- Knight, J., 2000. Introduction. In Knight, J. (ed.), *Natural Enemies. People-wildlife Conflicts in Anthropological Perspective*. Routledge, London, p. 1-36.
- Kruuk, H., 1972. Surplus killing by carnivores. *Journal of Zoology* 166, p. 233-244.
- Landry, J.-M., 1998. *L'utilisation du chien de protection dans les Alpes suisses : Une première analyse*, Kora Bericht, 2.
- Landry, J.-M., 2013. *Analyses comportementales des interactions entre des chiens de protection et des loups dans le parc national du Mercantour*. Rapport pour le Ministère de l'Agriculture et de la Pêche.
- Lapeyronie, P. & Moret, A., 2007. Protection des troupeaux et impacts environnementaux. In L. Garde (coord.) *Loup – Élevage : s'ouvrir à la complexité*. Actes du séminaire des 15-16 juin 2006. Éd. CERPAM, Manosque, p. 202-211.
- Larrère, C., 1997, *les philosophies de l'environnement*. Paris, PUF.
- Larrère, C., & Larrère, R., 2015. *Penser et agir avec la nature*. La Découverte.
- Larrère, R., 2014. Rumeurs de loups. *Revue Semestrielle de droit animalier* 1, p. 257-260.
- Larrère, R., Lizet, B. & Berlan-Darqué, M. (dir.), 2009. *Histoire des parcs nationaux*, Versailles Cedex, Éditions Quæ, « Hors collection ».
- Larson, G., Karlsson, E. K., Perri, A., Webster, M. T., Ho, S. Y. W., Peters, J., Stahl, P. W., Piper, P. J., Lingaas, F., Fredholm, M., Comstock, K. E., Modiano, J. F., Schelling, C., Agoulnik, A. I., Leegwater, P. A.,

- Dobney, K., Vigne, J.-D., Vilà, C., Andersson, L. & Lindblad-Toh K., 2012. Rethinking dog domestication by integrating genetics, archaeology, and biogeography. *Proceedings of the National Academy of Science* 109, p. 8878-8883.
- Lascoumes, P., Callon, M. & Programme risques collectifs et situations de crise (France), 1997. *Information, consultation, expérimentation : les activités et les formes d'organisation au sein des forums hybrides*. Séminaire. Programme risques collectifs et situations de crise, CNRS.
- Latour, B., 1999. *Politiques de la nature: comment faire entrer les sciences en démocratie*. La Découverte.
- Laundré, J. W., Hernández, L. & Ripple, W. J., 2010. The Landscape of Fear : Ecological Implications of Being Afraid. *The Open Ecology Journal* 3, p. 1-7.
- Lécrivain, É., Boutonnet, J. P., Deverre, C. & Lasseur, J., 2004. Dynamique de l'élevage ovin et mesure agri-environnementale : Étude de l'opération locale « pelouse sèche » dans le Luberon. In Dubeuf, J.-P. (éd.), *L'Évolution des systèmes de production ovine et caprine: l'avenir des systèmes extensifs face aux changements de la société*, Options Méditerranéennes, série A, 61, p. 171-178.
- Lefebvre, É. & Monnier, A., 2012. *Évaluation du protocole technique d'intervention sur les spécimens de loups dans le cadre du plan d'action national sur le loup 2008/2012*. Rapport pour le Ministère de l'écologie, du développement durable et de l'énergie et le Ministère de l'agriculture, de l'agroalimentaire et de la pêche.
- Lescureux, N., 2006. Towards the necessity of a new interactive approach integrating ethnology, ecology and ethology in the study of the relationship between Kirghiz stockbreeders and wolves. *Social Science Information* 45, p. 463-478.
- Lescureux, N., 2007. *Maintenir la réciprocité pour mieux coexister ? Ethnographie du récit Kirghiz des relations dynamiques entre les Hommes et les loups*. Thèse de doctorat MNHN.
- Lescureux, N., 2010. Le bon, la brute et le fantôme. *Annales de la Fondation Eysen* 24, p. 11-27.
- Lescureux, N. & Linnell J. D.C., 2010a. Knowledge and Perceptions of Macedonian Hunters and Herders: The Influence of Species Specific Ecology of Bears, Wolves, and Lynx. *Human Ecology* 38, p. 389-399.
- Lescureux, N. & Linnell, J. D.C., 2010b. Les montagnes sont-elles les derniers refuges des grands prédateurs ? *Histoire des Alpes – Storia delle Alpi - Geschichte der Alpen* 15, p. 195-210.
- Lescureux, N. & Linnell J.D.C., 2013. The effect of rapid social changes during post-communist transition on perceptions of the human - wolf relationships in Macedonia and Kyrgyzstan. *Pastoralism: Research, Policy and Practice* 3(4) [En ligne].
- Lescureux, N. & Linnell J. D. C., 2014. Warring brothers: the complex interactions between wolves (*Canis lupus*) and dogs (*Canis familiaris*) in a conservation context. *Biological Conservation* 171, p. 232-245.
- Lescureux, N., Linnell, J. D. C., Mustafa, S., Melovski, D., Stojanov, A., Ivanov, G. & Avukatov, V., 2011. The king of the forest: Local knowledge about European brown bears (*Ursus arctos*) and implications for their conservation in contemporary Western Macedonia. *Conservation and Society* 9(3), p. 189-201.
- Lestel, D., 2000. Faire la paix avec l'animal. *Études* 3931, p. 37-48.
- Linnell, J. D. C., Odden J., Smith M. E., Aanes R. & Swenson J. E., 1999. Large carnivores that kill livestock: do problem individuals exist? *Wildlife Society Bulletin* 27, p. 698-705.
- Linnell, J. D. C. & Lescureux N., 2015. *Livestock guarding dogs, cultural heritage with a new relevance for mitigating conservation conflicts*. Norwegian Institute for Nature Research, Trondheim, Norway.
- Linnell, J. D. C., Andersen, R., Andersone, Ž., Balčiauskas, L., Blanco, J. C., Boitani, L., Brainerd, S., Breitenmoser, U., Kojola, I., Liberg, O., Løe, J., Okarma, H., Pedersen, H. C., Promberger, C., Sand, H.,

- Solberg, E. J., Valdmann, H. & Wabakken, P., 2002. Fear of wolves: a review of wolf attacks on humans. *NINA Oppdragsmelding* 731, p. 1-65.
- Linnell, J. D. C., Promberger, C., Boitani, L., Swenson, J. E., Breitenmoser, U., & Andersen, R., 2005. The linkage between conservation strategies for large carnivores and biodiversity: the view from the “half-full” forests of Europe. In Ray, J. C., Redford, K. H., Steneck, R. S., and Berger, J. (eds.), *Carnivorous Animals and Biodiversity: Does Conserving One Save the Other?* Island, Washington, p. 381-398.
- Linnell, J. D. C., Swenson, J. E. & Andersen, R., 2000. Conservation of Biodiversity in Scandinavian Boreal Forests: Large Carnivores as Flagships, Umbrellas, Indicators, or Keystones? *Biodiversity and Conservation* 9, p. 857-868.
- Litz, M., 2008. *Du récit au récit médiatique*. De Boeck Supérieur.
- Lopez, B. H., 1978. *Of wolves and men*. Charles Scribner's sons, New York.
- Lorimer, J., 2015. *Wildlife in the Anthropocene*. University of Minnesota Press.
- Manceron, V., 2006. Discordes territoriales : les logiques rivales de la gestion de l'eau dans une région d'étangs française. *Géographie, économie, société* 8(3), p. 319-328.
- Manceron, V., 2009. Grippe aviaire et disputes contagieuses. La Dombes dans la tourmente. *Ethnologie française* 39(1), p. 57-68.
- Manceron, V., 2014. Les constructions sociales du danger : quelques usages de la notion de risque et d'infortune en sciences sociales, In Lagrée, S. & V. Diaz (ed) Perception et gestion des risques. Approches méthodologiques et appliquées au développement, Université d'été régionale en sciences sociales « Les journées de Tam Đảo » (Đà Lạt, Việt Nam), Juillet 2013, p. 37-54.
- Manceron, V. & Roué, M. 2009. Les animaux de la discorde. *Ethnologie française* 39(1), p. 5-10.
- Marboutin, E. & Duchamp, C., 2005. Gestion adaptative de la population de loup en France : monitoring à l'évaluation des possibilités de prélèvements. ONCFS, Rapport scientifique, p. 14-19.
- Martin, M., 2012a. *Du problème au risque : le pastoralisme cévenol entre chien et loup*. Thèse de doctorat de Sociologie, Université de Rouen.
- Martin, M., 2012b. Entre affection et aversion, le retour du loup en Cévennes comme problème public. *Terrains & travaux* 1 (20), p. 15-33.
- Mathevet, R., 2012. *La solidarité écologique. Ce lien qui nous oblige*. Arles, Actes Sud.
- Maurice, A-C., 2013, *Dynamiques des liens entre plantes rares, hommes et espaces : socio-anthropologie des pratiques de (ré)introductions végétales*. Thèse de doctorat en Socio-anthropologie de l'environnement MNHN.
- Mauz, I., 2005. *Gens, cornes et crocs*. Coéd. Cemagref-Cirad-Ifremer-Inra.
- Mauz, I., 2006a. Introduction, réintroductions : des convergences par-delà les différences. *Natures Sciences Sociétés* 14, p. S3-S10.
- Mauz, I., 2006b. Préface. *Revue de Géographie Alpine* 4, p. 5-6.
- Mauz, I., 2008. *Les collectifs et leurs natures. Un parcours sociologique, des animaux emblématiques à la biodiversité*. Humanities and Social Sciences. Université Jean Monnet, Saint-Étienne.
- Mauz, I., 2009. Les Alpes, de la société de la vache au parc animalier. In Larrère, R., Lizet, B., Berlan-Darqué, M., *Histoire des parcs nationaux*, Éditions Quæ, p. 187-204
- Mauz, I. & Blandin, P., 2014. Savoir environnemental, expertise et décision. In Zarka, Y.C. (éd.), *Le monde émergent : pour un monde habitable*. La Terre-Sol. Tome 2, Armand Colin, p. 39-58.

- Mauz, I. & Granjou, C., 2007. L'incertitude scientifique explique-t-elle la défiance ? Le cas de la réception des résultats du suivi scientifique du loup. In Allard, P., Fox, D., & Picon, B., *Incertitude & environnement. La fin des certitudes scientifiques*, Éditions Édisud, Aix-en-Provence, p. 383-396.
- Mech, D. & Boitani, L., 2003. *Wolves: Behavior, Ecology and Conservation*. University of Chicago Press.
- Mech, L. D. & Boitani, L., 2003. Wolf social ecology. In Mech, L.D., & Boitani, L., *Wolves: behavior, ecology and conservation*, University of Chicago Press, p. 1-34.
- Mech, L. D., 1995. The challenge and opportunity of recovering wolf populations. *Conservation Biology* 9, p. 270-278.
- Mermet, L. & Benhammou F., 2005. Prolonger l'inaction environnementale dans un monde familier : la fabrication stratégique de l'incertitude sur les ours du Béarn. *Écologie et Politique* 31, p. 121-136.
- Meuret, M. (coord.), 2010. *Un savoir-faire de bergers*. Educagri & Quae, Dijon & Versailles, p. 221-243.
- Micoud, A. & Bobbé, S., 2006. Une gestion durable des espèces animales est-elle possible avec des catégories naturalisées ? *Natures Sciences Sociétés* (Supp. 1), p. 32-35.
- Miller, F. L., Gunn, A. & Broughton, E., 1985. Surplus killing as exemplified by wolf predation on newborn caribou. *Canadian Journal of Zoology* 63, p. 295-300.
- Moret, A., 2007. L'utilisation du chien de protection dans les Alpes françaises. In L. Garde (coord.) *Loup-Élevage : s'ouvrir à la complexité*. Actes du séminaire des 15-16 juin 2006. Éd. CERPAM, Manosque, p. 118-129.
- Moriceau, J. M., 2007. *Histoire du méchant loup : 3 000 attaques sur l'homme en France (XVe-XXe siècle)*. Fayard.
- Moriceau, J. M., 2010. La dangerosité du loup sur l'Homme : une enquête à l'échelle de la France (XVIe-XXe s.). In Moriceau J.-M., & Madeline, P., (eds.) *Repenser le sauvage grâce au retour du loup. Les sciences humaines interpellées*. Presses universitaires de Caen & MRSH, Caen.
- Moriceau, J.M., 2011. *L'Homme contre le loup. Une guerre de deux mille ans*. Paris, Fayard.
- Moriceau, J.M., 2013. *Sur les pas du loup. Tour de France et atlas historiques et culturels du loup [archive], du Moyen Âge à nos jours*. Paris, Montbel.
- Moriceau, J.M., 2016. *Histoire du méchant loup. La question des attaques sur l'homme en France, XVe-XXe siècle*. Pluriel.
- Morizot, B., 2015. Rencontres animales, *Vacarme* (1), p. 204-227
- Morizot, B., 2016. *Les diplomates, cohabiter avec les loups sur une autre carte du vivant*. Wildproject.
- Mormont, M., 2006. Conflit d'usages et dynamiques spatiales. Les antagonismes dans l'occupation des espaces périurbains. *Géographie, économie, société* 8(3), p. 299-318.
- Mounet, C., 2006a. Les enseignements d'une expérience locale de gestion d'une espèce protégée : le cas du loup dans le Vercors. *Natures Sciences Sociétés* 14, p. S65-S66.
- Mounet, C., 2006b. Le monde agricole confronté au loup, au sanglier et à leurs partisans : un conflit d'usage et de représentation. *Revue de Géographie Alpine* 4, p. 89-109.
- Mounet, C., 2007. *Les territoires de l'imprévisible. Conflits, controverses et « vivre ensemble » autour de la gestion de la faune sauvage. Le cas du loup et du sanglier dans les Alpes françaises*. Thèse en géographie, Université Joseph-Fourier – Grenoble I.
- Mounet, C., 2008. Vivre avec des animaux « à problème ». Le cas du loup et du sanglier dans les Alpes françaises. *Revue de Géographie Alpine* 96(3), p. 55-64.

- Mounet, C., 2012. Conflits et reconfigurations socio-spatiales autour du sanglier : des postures générales aux arrangements locaux en territoire rural. *Économie rurale* 327-328, p. 79-95.
- Mounet, C. & Turquin, O., 2014. Espaces et acteurs pastoraux : entre pastoralisme(s) et pastoralité(s). Préface. *Journal of Alpine Research, Revue de géographie alpine*, 102-2 [En ligne].
- Nash, R., 1967. *Wilderness and the American Mind*. Yale University Press.
- Olivier de Sardan, J.-P., 2008. *La rigueur du qualitatif. Les contraintes empiriques de l'interprétation socio-anthropologique*. Academia-Bruylant, Louvain-La-Neuve.
- Olivier de Sardan, J. P., 1995. La politique du terrain. Sur la production des données en anthropologie. *Enquête. Archives de la revue Enquête* 1, p. 71-109.
- ONCFS, 2011. *Le Programme Prédateurs-Proies « L'impact du loup sur les populations d'ongulés sauvages dans les Alpes françaises »*. 8 p. [<http://www.oncfs.gouv.fr/PPP-Le-programme-predateur-proie-Loup-Ongules-ru494>].
- Passeron, J. C., 1991. *Le raisonnement sociologique: l'espace non-poppérien du raisonnement naturel*. Paris : Nathan.
- Plisson, A.-L., 2011. *Etude de la vulnérabilité à la prédation du loup des troupeaux ovins dans le parc naturel régional du Queyras*. Travail de Mémoire. Ministère de l'enseignement supérieur et de la recherche. École pratique des Hautes Études.
- Poinsot, Y., 2008. Les enjeux géographiques d'une gestion durable de la faune sauvage en France. *Annales de géographie* 5, p. 26-47.
- Porcher, J., 2002, *Éleveurs et animaux : réinventer le lien*. Paris, Presses Universitaires de France (coll. Partage du savoir).
- Porcher, J., 2011. *Vivre avec les animaux*. Paris, La Découverte, TAP/Bibliothèque du MAUSS.
- Porter, T. M., 1995. *Trust in numbers. The pursuit of objectivity, in science and public life*. Princeton, Princeton University Press.
- Raison du Cleuziou, Y., 2007. La nature embrigadée : conflit en baie de Somme. *Ethnologie française* 113, p. 153- 162.
- Raison du Cleuziou, Y., 2008. De la résistance à la subversion. Les chasseurs de la baie de somme et le développement durable. *Études rurales* 181, p. 133-148.
- Ratamäki, O. & Lähdesmäki, H., 2015. Kykenemmeko luopumaan susifetissistä ? –Kriittinen luenta suomalaisesta susihistoriasta. *Suden kanssa*, ed. J. Hiedanpää & O.Ratamäki. Rovaniemi: Lapin yliopistopaino. p. 16-41.
- Redpath, S. M., Young, J., Evely, A., Adams, W. M., Sutherland, W. J., Whitehouse, A. & Gutierrez, R. J., 2013. Understanding and managing conservation conflicts. *Trends in ecology & evolution* 28(2), p.100-109.
- Rémy, É., 1993. Comment saisir la rumeur ? *Ethnologie française* 23(4), p. 591-602.
- Renck, J.-L. & Servais, V., 2002. *L'éthologie. Histoire naturelle du comportement*. Paris, Seuil, (coll. Points sciences).
- Roué, M., 2006. Le désert, le wilderness et la forêt : Éthique protestante et naissance de l'écologisme. In Beck, C., Luginbühl, Y. & Muxart, T., *Temps et espaces des crises de l'environnement*. Versailles, Quæ, (Indisciplines).
- Servais, V. (Ed.), 2016. *La science humaine des chiens*. Lormont, France, (Le bord de l'eau).
- Simmel, G., 1992 [1908]. *Le conflit*. Paris, Circé.
- Skogen, K., 2015. The persistence of an economic paradigm: unintended consequences in Norwegian wolf

- management. *Human Dimensions of Wildlife* 20(4), p. 317-322.
- Skogen, K., Mauz, I. & Krange, O., 2006. Wolves and eco-power. A French-Norwegian analysis of the narratives on the return of large carnivores. *Revue de géographie alpine* 94(4), p. 78-87.
- Sourdril, A. & Welch-Devine, M., 2014. Conserver, gérer, étudier la biodiversité : quels apports de l'ethnologie ? *Ethnographiques.org* 27, *Biodiversité(S)*, [En ligne].
- Stohr, C. & Coimbra, E., 2013. The governance of the wolf-human relationship in Europe. *Review of European Studies* 5(4), p. 1-18.
- Theuerkauf, J., 2009. What Drives Wolves: Fear or Hunger? Humans, Diet, Climate and Wolf Activity Patterns. *Ethology* 115, p. 649- 657.
- Theuerkauf, J., Jedrzejewski, W., Schmidt, K. & Gula, R., 2003. Spatiotemporal Segregation of Wolves from Humans in the Bialowieza Forest (Poland). *Journal of Wildlife Management* 67, p. 706-716.
- Torre, A., Aznar, O., Bonin, M., Caron, A., Chia, E., Galman, M., Guérin, M., Jeanneau, Ph., Kirat, Th., Lefranc, Ch., Melot, R., Paoli, J.-C., Salazar, M.-I. & Thinon, P., 2006. Conflits et tensions autour des usages de l'espace dans les territoires ruraux et périurbains. Le cas de six zones géographiques françaises. *Revue d'Économie Régionale et Urbaine* 3, p. 415-453.
- UICN, 1998. *Lignes directrices de l'UICN relatives aux réintroductions. Préparées par le Groupe de spécialistes de la réintroduction de la Commission de la sauvegarde des espèces de l'UICN*. Gland, Suisse et Cambridge, Royaume-Uni.
- UICN, 2012. *Lignes directrices de l'UICN sur les réintroductions et les autres transferts aux fins de la sauvegarde*. Strasbourg.
- Vanier, M., (dir.), 2009. *Territoires, territorialité, territorialisation, Controverses et perspectives*. Rennes, PUR, (coll. Espace et territoires).
- Vincent, M., 2007. *Éleveurs de moutons entre Crau et Queyras, évolution du pastoralisme méditerranéen sous l'effet des politiques de l'agri-environnement et du loup*. Mémoire de diplôme EHES.
- Vincent, M., 2009. Le pastoralisme méditerranéen sous l'effet des politiques contradictoires de l'agri-environnement et du loup. *Ethnozootecnie*
- Vincent, M., 2010. Les pratiques des bergers dans les Alpes bouleversées par le retour de loups protégés. In M. Meuret (coord.) *Un savoir-faire de bergers*. Educagri & Quae, Dijon & Versailles, p.221-243.
- 87, p. 167-168.
- Vincent, M., 2014. La régulation du loup... pour son bien et celui du pastoralisme. *Revue semestrielle du droit animalier* 1, p.231-246.
- Wals, A. E. J., van der Hoeven, N. & Blanken, H., 2009. *The acoustics of social learning. Designing learning processes that contribute to a more sustainable world*. Wageningen: Wageningen Academic Publishers.
- Williams, C. K., Ericsson, G. & Heberlein, T.A., 2002. A quantitative summary of attitudes toward wolves and their reintroduction. *Wildlife Society Journal* 30, p. 575-584.
- Wooding, A., 2004. *Sensibilité face aux attaques de loups : Confrontation entre un modèle de sensibilité théorique(CEMAGREF) et sensibilité observée (constats d'attaques de loups)*. Stage de Master & Université Joseph Fourier, Grenoble.
- Zeder, M. A., 2011. The Origins of Agriculture in the Near East. *Current Anthropology* 52, p. S221-S235.
- Zlatanova, D., Atidje, A., Albena, V. & Peter, G., 2014. Adaptive Diet Strategy of the Wolf (*Canis lupus* L.) in Europe: a Review. *Acta zoologica Bulgarica* 66, p.439-452.

Zimmermann, B., Sand, H., Wabakken, P., Liberg, O. & Andreassen, H. P., 2015. Predator-dependent functional response in wolves: from food limitation to surplus killing. *Journal of Animal Ecology* 84, p.102-112.



MINISTÈRE DE L'ENVIRONNEMENT, DE L'ÉNERGIE ET DE LA MER,
EN CHARGE DES RELATIONS INTERNATIONALES SUR LE CLIMAT

Paris, le **20 OCT. 2016**

La Secrétaire d'État chargée
de la Biodiversité

à

Monsieur Bruno DAVID
Président du Muséum national d'Histoire
naturelle

Référence : D16019239
Objet : Volet sociologique de l'esco loup

Afin d'accompagner la présence du loup en France, espèce emblématique de notre patrimoine naturel, le Gouvernement a mis en place une série de mesures pour soutenir l'élevage et encourager le pastoralisme, qui sont confrontés à la prédation des troupeaux par l'espèce.

Face aux controverses que suscitent ces mesures, j'ai lancé le 7 juillet dernier, en accord avec Madame Ségolène ROYAL, une démarche d'évaluation prospective du loup à l'horizon 2025-2030. Les travaux de l'expertise collective scientifique et technique ont trait aux seuls aspects biologiques et écologiques de l'espèce.

La réunion que j'ai organisée au Muséum national d'Histoire naturelle avec votre concours afin de présenter les objectifs et les modalités de la démarche a mis en évidence la nécessité d'engager une démarche complémentaire sur les aspects sociologiques, culturels et ethnologiques sur la présence du loup en France.

Dans ce contexte, afin de compléter les éléments de connaissance ayant trait à la conciliation de la présence du loup avec les activités d'élevage et en comprenant le plus finement possible les enjeux sociologiques, je souhaite vous confier la réalisation d'une expertise collective scientifique complémentaire portant sur ces aspects.

Les travaux qui seront conduits par Monsieur Richard DUMEZ, ethnoécologue et maître de conférences au sein de votre établissement, pourront s'appuyer sur une commission resserrée composée de personnalités relevant des sciences humaines et sociales.

Compte tenu de la force des oppositions entre promoteurs et détracteurs de la présence du loup, cette commission devra mener ses travaux dans un esprit raisonné et distancié pour s'inscrire dans la logique promue dans le cadre du volet biologique de l'expertise : disposer d'une base scientifique objective s'agissant des relations humains-loup.

Copie à : Monsieur le Directeur de l'eau et de la Biodiversité,
Monsieur Le Directeur général de l'ONCFS

En annexe à cette lettre figurent les éléments du cahier des charges que l'expertise collective devra aborder.

Comme suite aux travaux préparatoires conduits avec mes services, l'expertise disposera d'une personne à plein temps, qualifiée et en capacité de consulter et compiler une littérature scientifique spécialisée, de réaliser des fiches de synthèse, d'assister les travaux de la commission et de contribuer à la rédaction finale du rapport d'expertise.

Les résultats de l'expertise collective devront être transmis au plus tard en mars 2017.



Barbara POMPILI

éléments du cahier des charges
de l'expertise collective scientifique portant sur les aspects sociologiques, culturels et
ethnologiques sur la présence du loup en France

L'expertise collective devra permettre que les éléments suivants soient traités :

- États des lieux des connaissances sur les relations contemporaines humains-loup en France ;
- Analyse des positions et des représentations des différents acteurs concernés par la présence du loup ;
- Mise en perspective de la situation française avec des exemples à l'étranger, la venue récente du loup après une longue éclipse induisant des positionnements très différents de pays où l'espèce a toujours été présente ;
- S'il y a lieu, analyse des processus mis en œuvre avec succès dans le traitement des sujets liés au loup (en France et à l'étranger) ;
- Identification des facteurs qui induisent des comportements sociaux différenciés d'un territoire à l'autre ;
- Établissement de pistes pour des recommandations ; les éléments produits par la commission doivent permettre de comprendre les diverses positions des acteurs afin de dessiner des pistes possibles de conciliation pour élaborer et mettre en œuvre une politique liée au loup ;
- Le cas échéant, soulever les lacunes du point de vue des connaissances et préconiser des études à même d'y répondre.

Collective scientific study on the sociological, cultural and ethnological aspects of the wolf's presence in France - 31 March 2017 - Muséum National d'Histoire Naturelle.

At the request of the State Secretariat for Biodiversity, a committee of experts has carried out an inventory of knowledge on the contemporary relations between humans and wolves in France, with a perspective that includes examples from abroad (main disciplines: anthropology, ethnoecology, geography, philosophy, sociology). Humans and wolves have interacted for a very long time and often share the same territories. The return of wolves arouses conflicts giving rise to different material and symbolic responses depending on the socio-ecological contexts concerned.

1) Five major controversies have occurred in France since this return in the early 1990s (origin of the return of wolves to France; the effective number of wolves; the desirable number of wolves and the regulation of populations; the objectives, efficiency and conditions of shootings; the impact of wolves on biodiversity) are analysed: temporal and spatial levels, the parties concerned and their respective arguments, links with other debates past or present. By intermingling and nourishing one another, these controversies draw up a genealogy. In addition, the positions of the parties involved are complex and evolve over time (pp. 11-20).

(2) A contextualised and dynamic analysis of conflicts makes it possible to transcribe the opposition between pastoral breeding and protection of wolves in a wider reality that includes a series of social actors, animals and environments involved in territorial dynamics under constant reconstruction. The complexity of conflicts can be traced through: (i) the reconfiguration of relations between pastoralism and environmentalism, (ii) the articulation between several spatial levels, global frameworks and local specificities, (iii) the specificity of long-term dynamics in a conflict that has persisted for 25 years, and (iv) the place of symbolic questions (pp. 20-30). The political and social stakes of knowledge production are also part of the conflict and concern all actors, who re-learn how to understand and interact with predators long absent from their territories. While this production fosters a temporary and relative consensus, it does not put an end to controversies and helps to shift them. Finally, there is still a problem of the relationship between field experience and scientific research, in particular concerning the protection of herds (pp. 30-36).

3) Maintaining wolves in areas occupied by human activities requires understanding the socio-ecological determinants of conflict. The hope to eliminate these conflicts and the zoning scenario having been excluded, taking action on the wolves themselves and finding social arrangements that keep conflictuality under a liveable threshold for all the actors appear as methods of limiting confrontations. Inventing ways of diverting wolves from herds requires understanding predation and associating the attack of domestic herds with a risk higher than the expectation of gain. This involves protecting flocks by adopting a "language" that wolves understand, and targeted harvesting of threatening/recidivist individuals, in combination with high tech surveillance and a good information flow (pp. 36-40). The impossibility of putting an end to conflicts also urges us to identify both the thresholds above which they become unproductive and the factors of good governance. Experimentation (especially mediation) must be carried out at the local level and participatory governance implies the expression of disagreements and the explanation of the fundamental values defended by the actors concerned. The terms of the relationship between humans and wolves finally refer to different forms of interaction, assuming to a certain extent their reciprocity and conflictuality (pp. 40-44).

(4) The Committee puts forward 31 non-hierarchical recommendations (pp. 45-48):

- To collectively reflect on the future of rural territories through the organisation of a fundamental debate at national level on the future of rural territories in agricultural decline (1 recommendation),
- Understand the plurality of human and non-human actors, contexts and situations in order to think about a differentiated (depending on the situations) and adaptive (taking into account the dynamic and evolving nature of these situations) way of management, while maintaining a principle of territorial equity (3 rec.),
- Acquire and develop knowledge and know-how through observation and experimentation (10 rec.),
- Improve transparency and the communication of information and data (5 rec.),
- Promote mediation (5 rec.),
- Promote the anticipation of the arrival of wolves on the new fronts of colonisation (7 rec.).