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Opinion / Perspective

Governing biodiversity: solidarity, justice and reciprocity in wildlife management

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Abstract. In the current epoch of profound anthropogenic transformations of ecosystems, managing wildlife cannot be reduced to simple technical adjustments in response to social tensions or conflicts. This article proposes a shift in perspective based on three principles—ecological solidarity, interspecies reciprocity and environmental justice—to reconsider the conditions of coexistence between humans and wildlife. These principles are not limited to damage prevention; they can also open up political spaces for diverse living beings and their relations. We therefore present a framework for analyzing socio-ecological viability consisting of four dimensions: ecological interdependence, ethical-political commitment, relationship quality, and institutional arrangement fairness. Through three case studies in France involving wolves (*Canis lupus*), wild boars (*Sus scrofa*) and greater flamingos (*Phoenicopterus roseus*), we examine three contrasting management strategies: conflict and polarization, pragmatic hunting and symbiotic negotiation—processes of mutual adjustment in shared environments. These cases do not describe fixed management regimes, but rather shifting configurations that reveal forms of power, situated knowledge and animal agency. Our analysis reveals the necessity of a wildlife governance that is more attentive to attachments, yet also more demanding in terms of reciprocity, and capable of recognizing the contributions of non-humans to shared environments. Transitioning from a logic of compensation to a policy of co-viability therefore necessitates supporting practices that foster a shared habitability and habitable futures for humans and other living beings alike.

Keywords. Ecological solidarity, Reciprocity, Environmental justice, Coexistence, Animal agency, Biodiversity governance, Wildlife management.

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Introduction: rethinking the place of wildlife in the Anthropocene era

Interactions between humans and wildlife are intensifying all over the world. However, these interactions are not confined to ecological friction or antagonism between species (Ingold, 1993; Haraway, 2022). They also frequently reveal social tensions between human groups that have different interests, knowledge and value systems relating to wildlife management (Madden, 2004; Marchini, Ferraz, Zimmermann, et al., 2019; Tsing et al., 2020). These encounters

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are generally referred to as "conflicts" and are often managed through reactive measures such as deterrence, control and elimination, which are based on a technocratic and dualistic view of nature (Ducarme and Couvet, 2020; Margulies and Karanth, 2018). Despite the sophistication of conservation efforts, they are failing due to the development of human infrastructure and the intensification of agriculture (Foley et al., 2005; Rudel et al., 2009; Simkin et al., 2022). The Anthropocene era—defined here as the epoch marked by massive human-driven transformations of the Earth system (Crutzen, 2002; Lewis and Maslin, 2015)—appears to be a period in which the boundaries between species, habitats, and governance are becoming blurred due to modern human activities. Therefore, wildlife should be approached not as an external problem, but as a common issue of livability.

The widespread and persistent conceptual framework of "conflict between humans and wildlife" often obscures the political, ontological (different ways of conceiving the being and role of non-humans, e.g., as resources, companions, or agents), and ethical dimensions of these relationships. This framework renders the distribution of harm and benefits, the epistemic asymmetries between stakeholders (e.g., between scientific expertise, local ecological knowledge, and policy framings), and the possibilities for coexistence beyond control invisible (Chapron et al., 2014; Frank et al., 2019; Jacobsen and Linnell, 2016). In this article, we argue that a new mode of governance is needed, one that moves from contributing to halting biodiversity loss and thereby generating tangible benefits for human societies to proactively constructing shared territories. To this end, we propose three guiding principles: ecological solidarity (Mathevet, Thompson, Delanoë, et al., 2010); reciprocity (Blount-Hill, 2021); and environmental justice (Fraser, 2009; Paloniemi et al., 2015). These principles raise distinct questions: Who benefits, who pays, and who decides? What knowledge is recognized? What obligations arise from our relationships with wild species?

According to Mathevet (2012), ecological solidarity redefines interdependence as a scientific and normative commitment. Reciprocity requires a transition from an instrumental logic to relationships founded on exchange and mutual recognition (Haraway, 2008; Plumwood, 1993; Roberts, 2005). Environmental justice emphasizes both the social distribution of ecological burdens and the recognition and participation of multiple stakeholders (Fraser, 2009). Together, these principles challenge reductionist governance frameworks and reorient wildlife management towards more localized, equitable and sustainable arrangements.

This proposal resonates with broader debates within the social sciences and conservation, often referred to as the "animal turn". In particular, animal geography has played a pivotal role in recent years in recentering animals within geographical and political analyses of place, space and identity. This approach has emphasized the need to recognize their agency and moral significance (Wolch and Emel, 1998; Lynn, 1998; Philo and Wilbert, 2000). Similarly, approaches developed under the banner of Compassionate Conservation advocate for an ethic of coexistence that rejects instrumental framings of wildlife, emphasizes the moral value of individuals and acknowledges natural harms (Ogra and Urbanik, 2018; Katz, 2024). Our framework builds on these insights while proposing a distinctive contribution: articulating solidarity, reciprocity, and justice as conceptual anchors for multispecies governance. In doing so, it extends the scope of animal geography and compassionate conservation by explicitly engaging with ecological dynamics, historical asymmetries, and the political consequences of encounters with wildlife in more-than-human worlds.

This article is divided into three parts. In Section 1, we set out the conceptual foundations necessary for rethinking the relationship between humans and wildlife through the lens of solidarity, reciprocity and justice. In Section 2, we present a socio-ecological viability assessment framework designed to analyze policies in terms of both their effectiveness and their ability to maintain viable interrelationships. Finally, in Section 3, we apply this framework to three empirical case studies in France: the wolf (*Canis lupus*), the wild boar (*Sus scrofa*) and the Greater flamingo (*Phoenicopterus roseus*). These contrasting species enable us to discuss in conclusion, how wildlife is governed and contested, and how it coexists with humans, proposing alternative approaches to governing living beings.

1. Theoretical foundations for a renewed relationship with life

1.1. *The principle of ecological solidarity: from ecology to legal standard*

Despite interest in the fields of conservation science and sustainability, the concept of ecological solidarity remains little known on the international stage (Chapin III, 2020; Rozzi, 2013). It was initially developed in France at the intersection of ecological science and law (Mathevet, Thompson, Delanoë, et al., 2010). Ecological solidarity enables us to reconsider the fundamental biophysical concept of the interdependence between living organisms and their environment as both a descriptive, objective fact and a normative principle (Fromont et al., 2022; Michelot, 2022). This change in perspective appears to go far beyond a mere metaphor for scientific rationality. It provides a normative framework rooted in the recognition of interdependence and in the idea that humans are part of, and dependent upon, biodiversity and ecosystem processes. This framework could transform governance towards more inclusive, ecologically grounded, and socially legitimate forms (Jolivet, 2022; Mathevet, Thompson, Folke, et al., 2016).

1.1.1. *A genealogy rooted in scientific ecology*

During the 2006 reform of French national parks (Borrini-Feyerabend et al., 2013), ecological solidarity was defined as "the close interdependence of living beings with each other and with the natural or developed environments of two geographical areas, whether contiguous or not" (Thompson et al., 2011). Although technical and administrative in nature, this formulation already seems to imply a new perspective. It situates living beings within a set of systemic, dynamic and multi-scalar relationships where the focus shifts from entities to continuities and assemblages of species, habitats and flows that interweave tensions and complementarities between ecological processes and governance institutions (Mathevet, Thompson, Folke, et al., 2016). Inspired by Leopold's Land Ethic (Leopold, 1949) and its contemporary interpretations (Callicott, 2013), this vision implies responsibility. Indeed, recognizing interdependence is not enough, it requires ethical and political commitment in order to truly care for it.

1.1.2. *From ecology to law: an ontological shift*

This redefinition was legally enshrined in France during the 2006 reform of National Parks, and was subsequently explicitly included in the Biodiversity and Landscape Restoration law (No. 2016-1087). According to Article L110-1 of the Environmental Code, all public decisions likely to impact the environment must now take into account "interactions between ecosystems, living beings and natural or developed environments". Although subtle, this legislative change has undermined the dualistic basis of environmental law, which is founded on a set of prohibitions and preservation measures. By replacing a logic of preservation with a relational architecture (Jolivet, 2022; Michelot, 2022), it appears to open up a new space: a normativity situated in interdependence that can accommodate more-than-human forms of life.

1.1.3. *De facto solidarity vs solidarity in action: a fundamental difference*

In our view, one important contribution of this framework lies in distinguishing between "de facto" and "in action" ecological solidarity. The former concerns ecosystem relationships (such as flows, feedbacks and co-evolutions) regardless of social or political recognition. The latter implies choosing to recognize these interdependencies and acting accordingly by anchoring oneself in broader, trans-specific collectives (Mathevet, Thompson, Folke, et al., 2016). Rather than being a dysfunction, the gap between these two dimensions becomes a shared space where multiple species and institutions co-exist and interact. This is a kind of in-between space shaped by aspirations, power asymmetries and conflicts of legitimacy (Jolivet, 2022; Mathevet, 2012). Rather than attempting to erase the human/non-human divide, governance now seeks to manage its thresholds, leaving space for fruitful hesitation.

1.1.4. *Co-viability: making solidarity measurable*

In order to make ecological solidarity effective, it must be given an operational framework. The theory of viability, which is derived from the mathematics of dynamic systems (Aubin, Bayen, et al., 2011; Aubin and Saint-Pierre, 2007), seems to offer such a framework. Viability refers to a system's ability to maintain its essential functions despite changing constraints

(Anderies et al., 2018; Mathias et al., 2020). When applied to hybrid systems, such as socio-ecosystems, it becomes "co-viability". This allows us to consider the capacity of human and non-human systems to support each other in an adaptive process (Barrière et al., 2019). This change in perspective necessitates a shift in the criteria used to evaluate the preservation of isolated entities, moving towards consolidating the relational conditions of livability. In this context, ecological solidarity is valuable not only as an ethical goal, but also as a measure of justice, a management indicator and a normative benchmark in an uncertain world. By justice, we refer not to the moral accountability of non-humans, but to the distribution of burdens and benefits across species. A lack of ecological solidarity translates into injustice when human institutions systematically deny the conditions of survival and flourishing to other species. In a sense, ecological solidarity transforms management into an art form, focusing on maintaining relationships rather than controlling them. It encourages us to consider conservation as a policy of coexistence.

Several recent proposals place it in a renewed institutional perspective: the "right to co-viability" (Barrière, 2022) as a right to shared habitability (Chezel et al., 2024). This vision shifts ecological solidarity away from its original field of application (i.e. protected areas) and establishes it as a structuring principle of relational environmental governance that extends far beyond protected areas themselves (Mathevet, Thompson, Folke, et al., 2016). The objective is no longer to restore a lost balance, but rather to address dynamic co-presences, shifting boundaries and precarious compatibilities. Living with other living beings, then, means maintaining the conditions for their viability without claiming to control their future, and accepting uncertainty and change.

1.2. *The principle of reciprocity: re-embedding human societies in ecological communities*

While ecological solidarity emphasizes the systemic interdependence of species and environments, reciprocity introduces an arguably more intimate and ethical framework for relations between humans and non-humans. In our view, it replaces purely functional conceptions of interaction, reconfiguring them in terms of exchange, care and mutual responsibility (Mathevet, Bousquet, et al., 2018). Therefore, the challenge lies not only in what humans take from the living world, but also in what they give back in return in material, symbolic and political terms. "Giving back" may involve material measures (restoring habitats, reducing pressures, reintroducing ecological functions), symbolic ones (recognizing the presence and value of non-humans in cultural narratives), and political ones (granting them representation in governance bodies).

1.2.1. *Anthropological and philosophical foundations*

Environmental anthropology has long taught us that the recognition of humans and non-humans often manifests in acts of exchange. Reciprocity, deeply rooted in the now classic triad of giving–receiving–returning (Heins et al., 2018; Mauss, 1925), has long transcended the strict realm of interpersonal interactions. In many contexts, it permeates cosmologies in which non-human living beings—spirits, animals, plants and elements—participate in a moral and material economy of exchange (Lute et al., 2016). In many societies, offerings, care and restraint in harvesting are gestures that crystallise mutual obligations towards the non-human world, thus anchoring social norms in ecological practice (Heins et al., 2018; Nadasdy, 2007; Papilloud, 2018). These practices cannot be reduced to "animistic" or folkloric irrationality. Instead, they implement subtle and localised regulations that facilitate coexistence in diverse worlds (Hann, 2006; Ojeda et al., 2022). Where the law struggles to grasp the plurality of entities involved, these practices establish lines of attention and shape shared worlds by maintaining debts, deferred gifts and renewed obligations.

Contemporary ecological thinking does not lie outside this horizon. Indeed, we sometimes see it attempting to reconnect with these modes of relating in a different way. For example, the French philosopher of sciences Edgar Morin (Morin, 2015) calls for an ontology of connectedness, arguing that the focus should be on cohabiting, co-producing and coexisting rather than dominating. In the theological realm, Pope Francis's encyclical *Laudato si'* (Pape François, 2015) mobilizes a figure of kinship with the Earth, reviving a long tradition of Christian and indigenous cosmologies in which humans are not outside nature but inside it. From these perspectives, otherness does not restrict ethics. Rather, it becomes

its condition. Interdependence forms the basis of responsibility. It is relationships, not fixed identities, that give rise to obligations (Baard and Ahteensuu, 2019; Held, 2005; Norton, 2015; Robinson, 2011). As such, belonging to an ecological community—often fragile, contested and precarious—becomes the basis for moral, political and territorial claims. In this regard, forms of debt and gift-giving do not disappear; rather, they are reconfigured around broader notions of reciprocity, committing humans and non-humans alike to inhabiting uncertain territories.

1.2.2. *A relational ethic against domination*

Reciprocity offers an interesting alternative to the utilitarianism that continues to reduce nature to available resources. Contrary to this frequent instrumentalization, thinking in terms of reciprocity implies giving practical attention, care and recognition to those entities that act, resist or support governance dynamics through their ecological behaviors (e.g., predation, mobility, reproduction), beyond the human world (Buller, 2014; Burlingame, 2025; Hodgetts and Lorimer, 2018; Ingold, 2011). In many agricultural or pastoral contexts, for example, the land is not only plowed, but also listened to, respected and handed down. Its fertility becomes the result of a relationship and localized commitment in practice (Hourdequin, 2025). These practices are often ordinary and sometimes invisible, yet they contribute to shaping ecological commons that are not instituted by law, but rather woven by mutual obligations between humans and non-humans (Hache, 2011). These forms of coexistence demonstrate that reciprocity encompasses more than just measurable exchanges; it is also embodied in actions, rituals, ways of living and ways of governing (Díaz and Pascual, 2025). Taking into account the cognitive, material and institutional dimensions of relationships seems to us to open up a space for rethinking ecological governance (Díaz, Pascual, et al., 2018). The latter would no longer be based solely on the management of flows, but on recognising the capacities and vulnerabilities of all those involved. From this perspective, politics becomes a space for relational negotiation, populated not by objects of planning or management, but by partners situated in shared worlds (Doré, 2013; Latour, 2020; Latour, 2012). The “wild experiences” described by Jamie Lorimer (Lorimer, 2015) form part of this dynamic. Rather than restoring a lost nature, the focus is on dealing with living otherness on a daily basis in a world that has already been largely transformed. Such an approach, in our view, does not seek to restore mythical harmony or naturalise conflict, but rather embraces the uncertainty, friction and negotiation that characterise all coexistence with other living beings (Wolch and Emel, 1998). However, this relational perspective would be incomplete without also focusing on attachment (Bousquet et al., 2022; Stépanoff, 2024). The latter refers to emotional bonds, often formed over time, that manifest as loyalty, responsibility, or dependence. Such bonds are frequently subtle and stifled by legal or technocratic frameworks, yet they are vital for developing a viable, situated, and just ecology of coexistence.

1.2.3. *Reciprocity and mutual control*

Several empirical studies on wildlife management show that reciprocity is not necessarily a harmonious exchange, but can instead be a tense relationship that is negotiated over time. In Kyrgyzstan, for example, herders and wolves engage in a process of adjustments and countermeasures involving mutual recognition, deterrence and learning. This is not based on mutual affection, but rather an unstable balance of control and recognition of coexistence (Lescureux, 2006). Similarly, in Western Europe, large wild animals such as wolves, bears, lynxes and wild boars occupy a similar place in both the imagination and the territory. They are never simply there. Their presence saturates social spaces with contradictory perceptions, strong emotions and territorial and political tensions (Benhammou, 2007; Doré, 2014; Mathevet and Bondon, 2022; Mounet, 2008). The deployment of management measures such as fences, culling plans and compensation schemes is not merely a technical response to an ecological issue. They actually reconfigure the relationships between species, social groups and citizens and the State. These measures draw on localised knowledge and memories, as well as emotions such as fear, empathy and resentment (Benhammou, 2007; Smith, 2022). In doing so, they create divisions between what is considered legitimate and illegitimate. A biopolitical reading (Foucault, 2008) enables us to comprehend these mechanisms as being structured by logics of power rather than as neutral. While disciplines organise individual behaviour, biopolitical logics manage

populations and assign relative value to lives. When applied to interspecies relations, this framework reveals the balance between care and control, protection and sorting, and recognition and distancing. It enables us to challenge the decisions that determine whether lives can be lived, reproduced or eliminated (Anderson, 2012; Curry et al., 2019; Merz et al., 2025). These regimes are reflected in everyday practices. In hunting, for example, the same animal can be a resource, a target and a monitored population. When treated as game, regulated as a threat and protected as heritage, the wild boar becomes an ambivalent being subject to contradictory expectations, regulations and emotions (Stépanoff, 2021). Such configurations demonstrate that the relationship between humans and non-humans is not a moral ideal, but rather a contested space of cohabitation traversed by the conflicting forces of governance, memory, emotions and politics.

1.2.4. *Towards a viable coexistence policy*

In our view, prioritizing reciprocity means fundamentally changing our perspective. Instead of evaluating a policy based solely on its ecological or technical results, we must consider the quality of the relationships it enables or hinders. This means viewing governance not as an exercise in optimization, but as an arrangement of obligations, presences and absences in a populated, contested world rife with multiple claims. This shift requires us to pay close attention to what non-humans do and know, and how their actions are translated or ignored in decision-making processes affecting them. It is not just a matter of recognizing their agency, but also of examining the often mundane, and sometimes institutionalized, mechanisms that render them discreet, disposable or simply inaudible. Reciprocity is therefore neither a matter of consensus nor of any pre-established balance. On the contrary, it involves constantly negotiating the conditions of coexistence—a situated practice of "living with" and "doing with" in a world that is already shared (Carter and Linnell, 2016; König et al., 2020; Michalon et al., 2016). Reciprocity does not align with ecological solidarity, but rather adds complexity to its promises. In our view, it invites us to consider socio-ecological viability not as a technical solution but as a politics of connection and an ecology of attachments, tensions and plural forms of living together. In this context, the use of terms such as "negotiation" or "partners" is metaphorical. It does not anthropomorphize wildlife but highlights how their behaviors and ecological dynamics constrain and reshape human practices and institutions. Recognizing otherness requires avoiding human categories while acknowledging that animal actions have political consequences.

1.3. *From conflict to coexistence: a spectrum of interspecific interactions and (in)justices*

Based on the principles of ecological solidarity and reciprocity outlined thus far, we must now consider how interspecies relationships are built and maintained on a daily basis within territories and bodies. As we have seen, interactions between humans and wildlife cannot be defined simply in terms of biology or geography. These interactions are rooted in narratives, legal frameworks, emotions, attachments, fears and power relations that underpin public action and local institutional arrangements. These relationships are always context-specific, oscillating between recognition and distancing, and between care and exclusion. Depending on historical, social and ecological circumstances, these relationships appear as open conflict, tacit tolerance or ingrained habits. In order to address the tensions they express, as well as what they obscure, it is insufficient to merely adjust technical devices or management tools. We must also revisit the knowledge regimes, categories of analysis and implicit norms that shape our thinking and actions regarding coexistence. Only then can a shared political ecology truly emerge—one that is attentive to the plural worlds that coexist without necessarily meeting.

1.3.1. *Deconstructing "coexistence": a management framework that needs to be overcome*

Over the past decade, the term "coexistence" has become firmly established in scientific discourse and the terminology of conservation science (Nyhus, 2016; König et al., 2020). At the same time, it has become commonplace in technical discourse and political mandates (Pooley et al., 2021). It has become particularly prevalent in contexts involving the return of large predators or the presence of so-called emblematic species in environments heavily impacted by humans. However, despite its constant

use, we believe that its meaning is often tied to a normative vision. This is the vision of an ideal to be achieved: reconciling human activities and the protection of biodiversity as well as possible. In this context, coexistence is primarily viewed as a risk reduction approach aimed at minimizing damage caused by wildlife or preventing the extinction of threatened species (Fajardo del Castillo, 2021; Marchini, Ferraz, Foster, et al., 2021), rather than as an actual lived reality situated within a specific context and subject to constant tensions and negotiations. This framing appears to be based on a set of assumptions that are rarely made explicit, but which we believe to be highly influential. These assumptions concern the legitimacy of animal presence, demographic thresholds of social tolerance and what constitutes the "right place" for a species in a given landscape (Harris et al., 2023; Philo and Wilbert, 2000; Mauz, 2002). These thresholds are not solely based on ecological logic; rather, they appear to be deeply rooted in cultural representations of nature, the wild, the useful and the harmful (Kansky et al., 2024). This often results in a limiting policy that translates into spatial compartmentalization, pushing wildlife to the margins (such as reserves, forests and areas of low economic value) while ensuring human sovereignty over inhabited, cultivated and productive spaces. These dividing lines outline the contours of conditional coexistence: a regulated sharing of space negotiated unilaterally and defined by the interests of the humans' majority. Though seemingly inclusive, this ontology of coexistence actually perpetuates an implicit hierarchy between beings and their right to inhabit. It subjects the presence of animals to governance calibrated to human priorities (Wagner et al., 2007), where otherness is only tolerated at the margins of legitimate action. In this configuration, local and vernacular knowledge obviously struggle to find their place. Their approaches to living beings, which often differ greatly from technocratic standards, are dismissed, marginalized, or reduced to mere anecdotes. Human communities themselves can become disjointed and cut off from their territories and socio-ecological networks when their practices conflict with the dominant conservation logic (Chambru and Mounet, 2021). Coexistence then ceases to be a shared project and becomes, in a sense, a slogan for an already established and rarely discussed world order.

1.3.2. *Towards an ecology of relationships: co-presence, neighborliness and shared habitability*

To move beyond the current dominant logic of damage limitation, we must rethink interspecies relations, relying more on the spatial and temporal dynamics of co-presence (Goffman, 1974; Merleau-Ponty, 1945). This concept, originating from interactionist sociology and political philosophy, refers to the mutual harmonization of beings sharing the same environment. Unlike the emphasis placed on discrete events of conflict or impact, this approach highlights the daily, often tacit and almost always embodied, adjustments that underpin cohabitation.

Our naturalistic experiences and field research, as well as a growing number of documented empirical examples, demonstrate the existence of negotiated co-presence. The adjustment of wildlife to human activities is interpreted here as a form of co-presence that forces humans to adapt as well. We use "negotiated" in a metaphorical sense to highlight these reciprocal adjustments, not to suggest intentional bargaining or to ignore wildlife's ecological otherness. For instance, wolves adjust their movements to avoid human activity; livestock grazing is adapted to the breeding cycles of protected birds, such as black grouse; and wild boars synchronize their foraging with periods or places where humans are absent. These micro-adjustments reflect what could be termed "situated intelligence" between species: forms of perception, anticipation and behavioral plasticity that are rooted in relational ecologies. Furthermore, the concept of neighborhood developed by the pragmatic philosopher Joëlle (Zask, 2020) appears to offer an interesting extension to this relational approach. Neighborhood cannot be reduced to spatial proximity. According to Zask (ibid.), it implies mutual recognition and shared responsibility. Wild boar display agency by shaping landscapes and influencing agricultural practices. We do not attribute moral responsibility to them; rather, we emphasize that their actions generate effects that humans must reckon with, thus redistributing responsibility within multispecies assemblages. While it is not necessarily emotional or harmonious, we believe that neighborhood also presupposes the ongoing negotiation of boundaries, rhythms and obligations. Consequently, coexistence appears to be a

process rather than a state, shaped by asymmetries, contested meanings, and evolving modes of interaction (Bergström, 2017). Recognizing animals as spatial and political actors (Edelblutte et al., 2023; Mathevet and Bondon, 2022) further challenges anthropocentric assumptions about action, adaptation and governance. Certain species, particularly those that cross or disrupt conventional boundaries, become "boundary animals" and are incorporated into the neighborhood, thereby challenging established dichotomies such as wild/domestic or nature/culture. Their presence requires not only technical adaptation, but also a reconfiguration of relationships.

To us, what is at stake in this reconfiguration of links to living beings resonates perfectly with certain urban and rural geography works that propose shifting the focus to habitability. Rather than viewing it as a simple technical attribute denoting housing comfort, access to resources or guaranteed security, these studies consider it to be a relational quality, or even an emergent property of social and ecological connections (Barrioz, 2023; Fourny and Lajarge, 2019; Lazzarotti and Frelat-Kahn, 2012; Lefort, 2020). Consequently, habitability is no longer confined to a set of measurable criteria. Instead, it is experienced, felt and negotiated through the depth of relationships formed in a place, the activities carried out there and the conflicts it generates. From this perspective, living is not merely a matter of material installation or functional appropriation. It is about establishing a presence, albeit sometimes fragile or contested, in a world already populated by humans, as well as by plants, animals, and narratives. In our view, therefore, habitability does not refer to a neutral space to be distributed equitably, but rather to a lived space that is always in tension and is coproduced and traversed by conflicts, interdependencies and multiple compositions. Therefore, it is no longer a question of opposing human territories to those of other living beings, nor of considering their juxtaposition as belonging to separate regimes of existence. Instead, we must follow the interlocking patterns, lines of contact and partial overlaps that outline more or less stable and viable forms of coexistence. From this perspective, the anthropologist Tim Ingold's proposal that worlds are constructed "in and through relations" through a process of "mutual world-making" (Ingold, 2011) appears highly promising. Environments do not exist as fixed backgrounds against which existences are superimposed. Rather, they are caught up in actions, rhythms and attachments, which they both enable and inherit. Therefore, habitability cannot be considered a state to be achieved, but rather a process to be maintained: a living fabric constantly in the making at the intersection of domestic practices (human, animal and plant), ecological dynamics, forms of social organisation and the regimes of attention that support or disrupt them. In this context, caring for a territory does not mean taking control of it or organizing everyone's place from a distance. It involves getting into the details of interactions, paying attention to subtle uses, latent conflicts and situated narratives (Burlingame, 2025; Held, 2005). It also involves dealing with uncertainty, cultivating trust and accommodating the diversity of knowledge and its discussion. In short, living and coexisting require forms of mediation that pay attention to the histories, conflicts and possibilities of a place.

1.3.3. *A political interpretation of interactions: socio-ecological justice and inclusion*

Having clarified our theoretical framework, we believe that a commitment to coexistence must address justice (Harris et al., 2023; Jacobsen and Linnell, 2016). Interspecies relations are rooted in asymmetries, not only between humans and animals, but also within human communities (Mace, 2014; Reed, 2008). Building on philosopher Nancy Fraser's model of justice (Fraser, 2009; Fraser and Honneth, 2003), we suggest evaluating the political ecology of coexistence through the prisms of distribution, recognition and representation.

Distributive justice concerns the distribution of costs and benefits. Who is affected by the material consequences of coexistence, such as damage to crops, loss of livestock and restricted access? Who benefits from symbolic or economic gains (e.g., ecotourism or conservation)?

Recognitional justice concerns the legitimization of knowledge and identities. Are local ecological knowledge systems, attachment to place, and the experiences of individuals or social groups considered in decision-making processes? Or are they dismissed as anecdotal, emotional or unscientific?

Representative justice concerns the inclusion of diverse stakeholders in governance processes. Who has the right to participate in defining problems,

designing actions and evaluating results? Are the views of non-experts, non-institutional bodies and non-humans given due consideration?

By addressing these three dimensions, we believe that we can articulate ecological solidarity as an ontological principle, as well as a normative and political commitment. As coexistence only makes sense if it considers the social and ecological conditions that make it possible, including non-human beings in governance—whether symbolically, procedurally or materially—seems to us to be a significant challenge in rethinking the political community.

2. A Framework for assessing the relationship with wildlife

Building on the principles set out in the first part of this article, we now shortly present an analytical framework for evaluating the quality of human–wildlife relations in a comprehensive manner. Rather than measuring the effectiveness of a policy in a technocratic sense (e.g., reducing damage or increasing shooting efficiency), the objective here is to evaluate how consistent it is with a social project based on co-viability (Barrière et al., 2019). We refer to this analytical framework as the "socio-ecological viability framework". It can be used to evaluate whether a socio-ecological system promotes sustainable coexistence between humans and non-humans (Roberts, 2005). We suggest it can be used to evaluate different wildlife management policies or monitor the evolution of the same policy—for example, before and after a reform—as part of an adaptive management approach (Holling, 1978; Marchini, Ferraz, Foster, et al., 2021).

2.1. *The scope of the assessment*

Building on the three principles outlined above—ecological solidarity, reciprocity, and justice—we propose an analytical framework designed to make visible the relations that wildlife management regimes create, sustain, or suppress. The framework is organized around four interdependent dimensions that explore how governance connects humans, institutions, and non-human living beings. Rather than assessing management effectiveness through isolated indicators, it invites an examination of the quality and depth of relationships that emerge from these arrangements—the forms of attachment, recognition, and cooperation that make socio-ecological systems viable. These four dimensions are:

2.1.1. *Integration of ecological interdependence (de facto solidarity)*

The first dimension aims to evaluate the extent to which public policies are based on a detailed understanding of ecological interdependencies. It is not merely a case of incorporating ecological variables into decision-making processes; it is also about recognizing ecosystem dynamics, such as flows, cycles and connections, as integral components of the environments in which we live. This requires us to go beyond administrative boundaries in order to follow landscape continuities, corridor networks and watersheds, as well as taking the territories inhabited by the relevant species seriously, even if they extend beyond mapped zones.

2.1.2. *Ethical and political commitment (solidarity in action)*

The second dimension focuses on the actual commitments of public institutions to fairer and more sustainable coexistence, rather than merely declared ones. It distinguishes between defensive or reactive approaches, which are focused on managing nuisances, and more proactive approaches, which demonstrate a clear intention to coexist with other living beings. This stance is evident not only in the tools used, such as protection status, hybrid legal mechanisms and forms of dialogue between stakeholders, but also in the narratives produced by institutions, the justifications given and the values promoted. Ultimately, it questions which living beings are considered legitimate to remain, be protected, or be changed or displaced.

2.1.3. *Quality of relational dynamics (reciprocity and co-presence)*

This third dimension is structured around the central question of whether existing policies recognize non-humans as agents in their own right, capable of learning, circumventing, alerting and acting. Here, we examine the various forms of co-presence between species, whether they are explicit or not. Our focus is on the practical arrangements that emerge,

the reciprocal adjustments made, and the shared attention regimes established. The implementation of animal behavior monitoring systems, local adaptation methods and forms of cross-compensation, such as creating refuges in exchange for tourist or agricultural use, demonstrate this lived reciprocity.

2.1.4. *Governance and socio-ecological justice*

Finally, the fourth and last dimension involves critically analyzing decision-making processes using Nancy Fraser's (2009) three-part framework: distribution, recognition and participation. Who bears the costs of coexistence (e.g., damage, fatigue and surveillance) and who reaps the material and immaterial benefits (e.g., funding and tourism promotion)? Are the identities and knowledge of the relevant groups—livestock farmers, hunters, local residents, national park officials, public authorities and scientists—recognized as equal, or are they implicitly ranked? Above all, who participates in the decision-making process? Who is absent or disqualified from the governance process? This form of collective deliberation could be qualified as a democratic decision-making process, as opposed to a purely bureaucratic or top-down approach.

2.2. *The operational analysis grid*

These dimensions can be broken down into a more operational framework (Table 1). Each dimension gives rise to a central question, potential indicators and sources of information that are rooted in concrete practices. Rather than being technocratic, the aim here is to construct a critical assessment that considers the variety of experiences, the tensions on the ground and the compromises that have been made. This framework is not intended to standardize, but rather to highlight the connections, adjustments and tiny stories that often remain on the margins of analysis and which shape the possible forms of coexistence.

2.3. *Scope and limitations of the framework*

Our proposed framework seeks to broaden the scope of traditional methods of assessing human–wildlife interactions by combining technical effectiveness with relationship quality, social justice and ethical responsibility. This framework could facilitate comparative studies in different socio-ecological contexts. Although it offers a broader perspective, its practical implementation faces various obstacles. The process of measuring the experiential knowledge available to local stakeholders remains complex. Qualitative social science methods do not always allow for the straightforward measurement of emotional bonds between humans and non-humans, nor for the detection of animal agency in the form of action, resistance and adaptation. These elements require research methods that combine inductive approaches with participatory, context-specific, qualitative enquiry. Nevertheless, this framework is intended as a flexible conceptual tool rather than a rigid model or prescriptive checklist. It should be viewed as a reflective tool that requires development through discussions with land and wildlife managers and continuous collective learning in real-world contexts. This approach certainly falls within the realm of adaptive governance, as it acknowledges that uncertainty is an inevitable part of life (Holling, 1978). By embracing the diversity of knowledge systems and ways of life, we believe it helps to establish ecological integrity and social equity, while recognizing the political and moral value of otherness in our shared socio-ecological world.

3. Three models of human–wildlife relations

This third section forms the empirical core of this work. Through the systematic application of the socio-ecological viability framework to cases involving wolves, wild boars and flamingos in France, we intend to demonstrate the analytical relevance of the framework and reveal the underlying logic, contradictions and potential of current management models. To facilitate understanding of these analyses, which are discussed briefly in this paper, Table 2 below summarizes the main biological, ecological, sociocultural and political factors relating to the three species in question.

3.1. *The Wolf (Canis lupus): solidarity put to the test in conflict*

The natural recolonization of France by wolves via the Italian Alps, confirmed in Mercantour National Park in 1992 (PNA, 2024), has become one of the

Table 1. Socio-ecological viability analysis grid

Dimension	Key question	Assessment indicators (examples)	Sources and methods
1. Ecological interdependence (*de facto solidarity*)	Is management based on a systemic understanding of ecological dynamics?	Consideration of ecological corridors, connectivity, and species dispersion, population dynamics Management carried out at the landscape or watershed scale, not limited to administrative boundaries Integration of scientific knowledge on the functional role of the species in the ecosystem (e.g., regulation, engineering)	Scientific reports and papers, National Action Plans (PNA), Departmental Hunting Management Plans (SDGC) Maps of green and blue corridors Landscape ecology studies Scientific committees (e.g., National Council for Nature Protection—CNPN, National Parks) Interdisciplinary surveys
2. Ethical-political commitment (*solidarity in action*)	Does the policy demonstrate a preference for long-term coexistence over crisis management?	The protection status of the species, along with official statements from ministries and agencies The explicit objectives of the plan (e.g., "maintain a favorable conservation status" vs. "limit damage" or "regulate population numbers") The existence and promotion of innovative legal mechanisms that promote conservation (e.g., environmental real obligations)	Legislation: Environmental Code, PNA, SDGC Ministerial statements and press releases Administrative and judicial case law Sociological surveys
3. Relational dynamics (reciprocity and co-presence)	Does the policy promote a reciprocal relationship or a relationship of domination/instrumentalization?	A preponderance of prevention, adaptive and learning measures (such as guarding and scaring) versus destruction measures Recognition of wild animals as subjects capable of adaptation and learning The existence of functional "gift/counter-gift" mechanisms (e.g., a habitat created or maintained by an economic activity in exchange for ecotourism activities) is recognized	Analysis of field practices (herd protection, feeding, land management) Interviews with stakeholders (livestock farmers, hunters, natural area managers, etc.) Analysis of discourse and representations of stakeholders

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Table 1. (continued)

Dimension	Key question	Assessment indicators (Examples)	Sources and methods
4. Governance and socio-ecological justice	Is the decision-making process inclusive, adaptive, and fair?	The composition and functioning of governance bodies (e.g., the National Wolf Group and departmental commissions) Local-level mediation and negotiation is facilitated by the presence of mediators Transparency of data (e.g., population numbers, locations and damage) and decision-making processes Modalities for distributing protection efforts and compensation for damage Consideration of local knowledge and the views of non-economic stakeholders (e.g., associations and the general public) Ability to make the living beings concerned visible; effective participation in the definition of standards; possibility of challenging or adjusting regulations; recognition of animal agency	Governance meeting minutes Public policy evaluation reports Analysis of allocated budgets and financing mechanisms Sociological surveys Regulatory frameworks and mechanisms (hunting plans, zoning, compensatory measures) Methods of public participation and representation regarding wildlife

country's most emblematic socio-ecological conflicts (Dumez et al., 2017). It stems from the tension between the strict protection regimes of the Bern Convention and the European Habitats Directive and the extensive pastoral systems that shape rural territories (Marie, 2009). Praised for their contribution to biodiversity and open landscapes (Fajardo del Castillo, 2021), these practices are also challenged by the return of a protected predator that reconfigures relations between humans, livestock, and ecosystems (Meuret et al., 2021). As in other cases of large carnivore recovery, the wolf epitomizes the contradictions of contemporary conservation governance, where ecological restoration meets pastoral vulnerability and conflicting values of nature (Arpin, 2020; Mounet, 2019; Carter and Linnell, 2016). It thus embodies a form of conflictual solidarity, where coexistence depends less on regulation than on maintaining dialogue across asymmetrical worlds. The government's recent easing of lethal control, presented as pragmatic, has instead reinforced structural disengagement and weakened coexistence as a collective horizon (Benhammou and Degeorges, 2025). Explicitly criticized by the French National Council for Nature Protection (CNPN, 2023) and the European Parliament in 2025, this shift implies a devaluation of the species, without clear conservation objectives, and fails to implement a coexistence strategy based on scientific data and socially negotiated agreements. Recent research (Merz et al., 2025; Ordiz et al., 2024) highlights the ineffectiveness of culling in controlling predation, while public research and wildlife management organizations such as INRAE & OFB demonstrate that sustainable management depends primarily on adapted pastoral practices and collective mechanisms.

As Doré (2025) observes, the return of wolves unsettles the fragile compromises that once organized relations between pastoralists, conservationists, and local residents, and generates a *political propagation*:

Table 2. Biological, ethological, ecological characteristics and conservation statutes and management regimes of the three case studies

Characteristics	Wolf	Wild boar	Greater flamingo
Scientific name	*Canis lupus*	*Sus scrofa*	*Phoenicopterus roseus*
Family	*Canidae*	*Suidae*	*Phoenicopteridae*
Size/Weight	110–150 cm; 18–40 kg	125–165 cm; 70–110 kg	120–145 cm; 2–4 kg
Life expectancy	12–14 years	10–12 years	20–40 years
Reproductive cycle	1 per year; gestation 62 days	1 per year; gestation 115 days	1 per year; incubation 27–31 days
Litter	4–5 cubs	5–6 piglets	1 egg
Diet	Strict carnivore	Opportunistic omnivore	Filter feeder (invertebrates, algae, crustaceans, seeds)
Social organisation	Hierarchical pack	Matriarchal groups	Dense colonies (up to several thousand individuals)
Communication	Howling, marking, postures	Growling, squeaking, odours	Vocalisations, visual postures
Territorial	Territory 150–500 km^2	Territory highly variable (5–150 km^2)	Colonies linked to nesting sites
Mobility	>100 km during dispersal	Nocturnal movements 5–20 km	Partial migrant (local and regional)
Activity	Dusk/night	Dusk/Nocturnal	Diurnal (peak activity in early morning and evening)
Role in the ecosystem	Key predator; regulates ungulates	Engineer species, affects soil and crops	Indicator species for healthy wetlands, sediment mixing, waterbird assemblages
Habitat	Forests, mountains, hedgerows	Forests, crops, wetlands	Lagoons, ponds, salt marshes
Range	Holarctic	Eurasia, North Africa, introduced elsewhere	Mediterranean basin, Africa, Asia
Estimated population	France (2023): ~1104 individuals, Europe: ~17 000	France: >1 million individuals, Europe: rapid expansion	Global: ~550 k–680 k, Europe: ~45 k–62 k pairs, France: ~10 k up to 25 k pairs
Adaptability	Very high	Exceptional	Moderate but dependent on protected sites
Mortality factors	Hunting, disease, human conflict	Hunting, collisions, disease, regulation	Habitat disruption, pollution, human disturbance
Protection Status (France) and IUCN Conservation Status	From Strictly protected (Bern Convention) to Protected in 2025, Habitats Directive; IUCN: LC (Least Concern) but on the Red list (Vulnerable) in France	Not protected, game species; localy pest species; IUCN: LC	Birds Directive, Natura 2000; IUCN: LC

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Table 2. (continued)

Characteristics	Wolf	Wild boar	Greater flamingo
Characteristics of Main Public Management Policies (macro, meso, micro scales)	Macro: Wolf plans; Meso: compensation, committees; Micro: local removal, coexistence dialogues	Macro: regulated hunting to reduce crop damages, health measures; Meso: hunting federations; Micro: local control	Macro: wetland conservation; Meso: Natura 2000 management; Micro: site management, bird scaring in rice fields and institutional arrangements
Management regime	Highly symbolic species, crystallizes human/nature conflicts; highly politicized and contentious management	Prolific species, hybrid management (game/pest/health); major agricultural and social issues and conflicts	Heritage species and charismatic species, relatively peaceful governance; positive interactions with territory

Sources: OFB, IUCN, Action Plans, Wetland international, Tour du Valat.

local disturbances expanding into national debates and mobilizing publics and institutions around how to live together. The following section examines how these tensions between national management choices and local living together materialize through management practices, institutional arrangements, and situated experiences of coexistence. It shows how ecological, political, and moral claims become entangled in the governance of wolves in contemporary France.

*Dimension 1. Ecological interdependence (*de facto *solidarity).* Until recently, the prevailing management strategies prioritized intensive scientific monitoring of the national wolf population. From the 2000s to the early 2020s, this population experienced significant growth, driven by the gradual recolonization of the national territory. However, since 2022–2023, numbers have fluctuated around 1000–1100 wolves, suggesting a slowdown. The 2024–2029 National Action Plan continues this quest for genetic and demographic knowledge. However, we believe that this scientific approach is incomplete and disproportionately focused on attacks on livestock. It largely ignores the ecological role of wolves as apex predators, particularly their contribution to regulating wild ungulate populations and generating positive trophic cascade effects (Laundré et al., 2014; Martin et al., 2020). Although these functions are well established in the ecological literature and highlighted by conservation NGOs, they are conspicuously absent or incomplete in the current framework. Similarly, the ecological impacts of protective measures, such as the presence of guard dogs or the proliferation of fences, on non-targeted biodiversity are rarely assessed. Thus, recognition of interdependencies remains highly incomplete and selective.

Dimension 2. Ethical and political commitment (solidarity in action). The State's position appears rather ambivalent. Legally, it is bound to ensure a favorable conservation status for the species (Boyer, 2016; Trouwborst, 2018). However, successive policies have increasingly favored lethal control measures, including relaxing shooting protocols, increasing the number of authorized shooters and developing specialized equipment (Di Bernardi et al., 2024). France has also supported the recent EU initiative to change the protection status of wolves from "strictly protected" to "protected" (Trouwborst, 2025). This strategic shift seems to reflect a form of solidarity primarily aligned with agricultural interests promoted by dominant agricultural lobbies, at the expense of promoting more balanced forms of coexistence. It can be viewed as a utilitarian and instrumentalized version of ecological solidarity that emphasizes negative interactions while detaching pastoralism from its ecological origins. In our view, a sincere approach to ecological solidarity would also involve recognizing the network of interdependencies that supports pastoral systems, including the presence of wolves. In particular, pastoralism faces numerous difficulties (economic competition, access to land, etc.) over which it has little control: wolves then represent a more accessible scapegoat, and public controversies and

management decisions present the wolf primarily as a pastoral threat. It would also require a comprehensive assessment of the social and ecological costs of protective measures, including stress on shepherds and livestock, the ecological impact of night enclosures, disturbance to wildlife by guard dogs and growing tensions with hikers and local residents. In some regions, this could even call into question the legitimacy or long-term viability of pastoral practices themselves. Current trajectories seem far from such reflexivity. Therefore, solidarity in action remains clearly asymmetrical, anthropocentric and mainly reactive.

Dimension 3. Relational dynamics (reciprocity and co-presence). The institutionalized relational regime appears to us to be largely antagonistic. Wolves are generally presented as a threat and a "problem to be solved", with dominant discourses saturated with terms such as "defense", "pressure" and "nuisance" (Chandelier, 2018). Beyond monetary compensation, which we consider to be more akin to a financial transaction than a reciprocal commitment (Carnis and Facchini, 2012), there appears to be no form of symbolic or material compensation that recognizes the presence of wolves (Steele et al., 2013). In our view, this deteriorated relationship tends to overlook or downplay animal agency, whereas other perspectives could exist, or indeed already do exist in a few places. For instance, initiatives of community-based wolf governance in parts of Italy and Spain (Marino et al., 2022) or co-management arrangements with Indigenous peoples in North America provide alternative perspectives. Although potentially lethal, predation can be viewed not only as an attack, but also as an invitation to negotiate shared space. From this perspective, the use of force—whether through scaring or, in rare cases, selectively removing individuals that repeatedly attack livestock despite preventive measures—can be reconfigured as part of an adaptive dialogue that considers animals' learning and behavior (Lescureux, 2006). Still, such measures raise a crucial risk: that otherness is tolerated only insofar as it remains convenient for humans, thereby reproducing a logic of domination where fairness is unilaterally defined. Recognizing wolves as cohabitants therefore requires clearer criteria for what counts as "fair reciprocity," grounded not only in human interests but also in broader socio-ecological relations. Like shepherds, wolves adapt by avoiding certain areas, changing their movements, and negotiating space. Acknowledging these responses could pave the way for coexistence based on mutual adjustment rather than domination.

Dimension 4. Governance and socio-ecological justice. In France, wolf governance is largely centralized and dominated by organizations such as the National Wolf Group, an ad hoc body created by ministerial institutions rather than a permanent institution. The balance of power remains uneven between the agricultural sector and environmental organizations (Dumez et al., 2017; Nicolas and Doré, 2023). Important decisions, such as those concerning culling quotas, are still perceived as political rather than scientific. Although compensation schemes may partially fulfil the requirements of distributive justice, they struggle to take into account intangible damages such as chronic psychological stress, social isolation, an increased workload or questioning the meaning of work. Meanwhile, recognition justice remains hampered by persistent mutual stigmatization between farmers, conservationists, and animal rights activists. Representative justice also remains limited. Participation mechanisms are often considered to be merely symbolic or formal, offering insufficient opportunities for deliberation. However, some local initiatives offer alternative approaches. The Vercors Action Plan 2018–2023: "Wolf & Territory", including the shared narrative "living together and sharing the Vercors" of the Vercors Regional Nature Park, for instance, attempts to move beyond entrenched conflictual discourse. Participatory action research projects such as RECIBIODAL in the Belledonne Massif in the French Alps and COEXIST also in the Vercors explore a key question: how can local communities care for their territories, landscapes, pastoral practices, wildlife and social ties as interconnected entities? These initiatives are shifting governance towards collaborative territorial management by highlighting these interdependencies and co-constructing a shared narrative, thereby moving away from zero-sum games.

The case of wolves in France highlights the challenge of translating ecological solidarity into practical, embodied governance. Our socio-ecological viability framework reveals that a management regime based on control and compensation rather than

negotiation and reciprocity persists. Furthermore, it shows that wolves are not considered as cohabitants or sensitive agents, but rather as threats to be managed or even eliminated. Farmers, for their part, are forced to comply with top-down protocols that disregard local knowledge and context. This case study demonstrates the usefulness of our analytical framework in unpacking the implicit logics underlying current management models. It also emphasizes the necessity of adopting more inclusive, adaptive and relational governance approaches that recognize the agency of non-humans and the co-construction of territories. Nevertheless, it remains challenging to fully grasp the tacit knowledge, emotional relationships, and silent negotiations that shape everyday coexistence. This exploration of the wolf case shows that the quality of cohabitation cannot be deduced solely from documents or compensation mechanisms; rather, it is embodied in recognition, attention, and the emergence of situated ways of life (Chezel et al., 2024; Creti et al., 2022). Alongside national actors such as State agencies, conservation NGOs and agricultural unions, the role of local mediators at the meso and micro levels must be reaffirmed and studied (Chambru and Mounet, 2021; Dumez et al., 2017; Lawson, 2002; Marchini, Ferraz, Foster, et al., 2021; Mathevet and Béchet, 2020).

3.2. *Wild boar (Sus scrofa): utilitarian management put to the test of co-viability*

Unlike wolves, whose management is characterized by significant symbolic and political tensions, wild boars—whose numbers have increased in all regions of France since the 1970s—are subject to a regulatory regime that appears to be both less contentious and more pragmatic. Their official status varies between "game species", "species likely to cause problems" (i.e. the new legal designation for species formerly known as "pests") and "health threats". They are also often considered not entirely wild due to manipulation by humans, such as feeding, crossbreeding with domestic pigs and breeding/release projects. In all cases, wild boars are not considered cohabitants of a shared territory, but rather populations to be managed and regulated according to human interests, primarily big game hunting and agriculture.

Dimension 1. Ecological interdependence: reduced solidarity. Wild boar management is structured by departmental hunting management plans (SDGC, i.e. at the district level) and forms part of agricultural damage control objectives (Cardoux and Perea, 2019; Mathevet and Bondon, 2022). Various management indicators, such as areas prone to damage, crop types and population estimates, trigger local interventions aimed at reducing wild boar populations, which are often abundant. However, the species' ecological contributions, such as soil disturbance, seed dispersal and habitat creation, remain largely unknown. This limited perspective only considers the species as a nuisance or a risk, sometimes spreading African swine fever and causing damage, road accidents and train crashes, and does not recognize its role in how ecosystems work (Fattebert et al., 2017; Morelle et al., 2015), nor its rightful place in human territory. Such selective solidarity compromises any genuine recognition of our socio-ecological entanglements.

Dimension 2. Ethical and political commitments: a delegated public service. The management of wild boar populations thus appears to be part of an implicit agreement between those involved in agriculture, hunting and forestry. This agreement is often presented as rational and consensual and is known as the "agro-forestry-hunting balance". However, this apparent consensus conceals a fundamental contradiction: historical hunting practices have favored the growth and spread of wild boar populations through conservative hunting, feeding, breeding and releasing game, while the same stakeholders are now tasked with regulating them (Mathevet and Bondon, 2022; Mounet, 2012). Hunters often refrain from shooting females for practical reasons (they provide less meat), management objectives (fear of losing the resource) and ethical considerations (it is considered inappropriate). Indeed, in a highly polygynous species, this practice has little effect on population growth, since all fertile females are fertilized, even when males are scarce. This scientific perspective could help to change hunting practices by showing how current patterns disrupt natural mortality regimes. Overall, this form of solidarity is based on an assumed anthropocentrism that excludes animals from any form of cohabitation partnership. This makes perfect sense when the public service of regulation is delegated to hunting federations without ever questioning the socio-ecological model based on wild boar abundance, which created the problem

in the first place. The recent shift towards biosecurity arguments—"white zones" and preventive culling—has reinforced the dominant management logic by legitimizing increased control in the name of global health crises. This reveals a system that is ethically fragile in the face of sectoral interests and global health crises (Mathevet and Bondon, 2022).

Dimension 3. Relational dynamics: rejected reciprocity and local adjustments. The relationship between humans and wild boar remains deeply asymmetrical and is structured by the logic of control and instrumentalization. Measures such as banning the feeding of animals are implemented to prevent damage, but these measures are based on unilateral conditioning rather than interacting with animals in ways that require continuous adjustment. Wild boar are not considered to be inhabitants of the territory or neighbors with whom to coexist, but rather entities to be controlled or eliminated. There is no institutional recognition of animal autonomy or mutual learning. At the meso and macro levels, governance is still dominated by technocratic sectoral logics. However, at the micro level, those involved, particularly hunters and farmers, often recognize the adaptability, memory and learning capacity of wild boars (Mathevet, Bousquet, et al., 2018; Mounet, 2012; Mounet, 2008). Behavioral plasticity, avoidance strategies and nocturnal changes illustrate the animals' ability to adapt and negotiate their place. These forms of animal intelligence could inspire a more reflective and adaptive mode of coexistence, but they remain largely marginalized. Furthermore, as with wolves and pastoralism, local hunting practices are disconnected from the broader networks of interdependence—social, symbolic and ecological—that once supported and gave meaning to them. Official discourse primarily presents hunting as a regulatory tool, divorced from its relational, ethical, emotional, and ritual dimensions (Ginzburg, 1986; Hell, 1998; Stépanoff, 2021). This form of disembedding can only hinder the prospect of renewed coexistence by obscuring the forms of attention and responsibility that could be inspired by everyday interspecies relations.

Dimension 4. Governance and justice: a closed and asymmetrical system. The governance of wild boars takes place within a utilitarian technocratic framework that clearly serves the interests of the main users of natural resources, such as farmers, foresters and hunters. Other stakeholders, such as residents, naturalists and hikers, are represented in various management bodies but are structurally excluded from the bodies that make real decisions. The animal itself appears to be considered solely in terms of control (Fattebert et al., 2017). Distributive justice is also internalized within the "agro-hunting" system through compensation payments financed by hunters; however, these mechanisms externalize the ecological and symbolic costs to society and ecosystems. As for recognition justice, it seems virtually non-existent. Farmers' and citizens' ecological knowledge appears marginalized, and the role of animals as ecological subjects largely goes unheard.

This case of the wild boar, which we have just explored briefly, highlights the limitations of a management regime based on the triptych of "control, delegation and utility". This regime fails to consider animals as inhabitants of shared territories, contrasting sharply with the more politicized and contested case of wolves, where imperfect governance experiments have nevertheless emerged. Wild boars are either tolerated or eliminated depending on the circumstances, but are rarely considered as relational subjects. We believe that this situation can be explained, at least in part, by the ambiguity of their status as a hybrid between domestic and wild animals. As several studies have shown, this ambiguity produces both rigid macrosocial frameworks and flexible, adaptive and often informal local arrangements. This reveals fragmented governance, oscillating between technoscientific rationalizations and pragmatic improvisations. Our own analytical framework also reaches a point of tension here. How can we evaluate the quality of a relationship that is not named, discussed or conceptualized? How can we consider the agency of an animal whose presence is only recognized through the damage it causes to goods and people, or through the instrumental value attributed to game? Ultimately, we believe that the case of the wild boar illustrates a management approach that may produce effective local results in the short term but which fails to address the broader challenges of justice and the sustainability of socio-ecological relations. Rethinking governance therefore requires moving away from the exclusive logic of population control towards an ethic that recognizes the place of others—whether

human or non-human—and values attention, recognition and care as highly as accounting balances or tolerance thresholds. In this respect, the case of the wild boar builds on the lessons learned from the wolf. It reminds us that the absence of explicit or acute conflict should not be confused with genuine coexistence, and that the quality of interspecies relations is demonstrated as much through silence as through open controversy.

3.3. *The Greater flamingo (Phoenicopterus roseus): towards negotiated symbiotic coexistence in the Camargue*

Unlike the intense tensions aroused by the other animal figures mentioned above, the case of the Greater flamingo in the Camargue (Rhone delta, Southern France) appears to offer another form of cohabitation that, while seemingly less conflictual, is just as fraught with political issues. Rather than being characterized by an absence of conflict, this case is defined by the way in which animals and the irreducible otherness of the wild are welcomed and mobilized, and sometimes even celebrated, within local territorial configurations (Mathevet, Olivier, et al., 2018). Here, the wild is neither presented as a threat nor perceived as an intruder to be regulated; rather, it is seen as a full-fledged partner caught up in the shifting dynamics of a territory in perpetual change. The Great flamingo engages in a particular form of coexistence that does not erase asymmetries or necessary adjustments. Instead, it outlines a more symbiotic and negotiated relationship with other living beings, creating an intertwined presence, attention, management and compromise. This relationship is partly institutionalized. It is neither unrealistic nor idyllic. Rather, it is based on tacit agreements, accumulated actions and a fairly sophisticated environmental governance. The resulting balance is obviously neither fixed nor guaranteed. It is fragile, but not illusory or temporary. On the contrary, it outlines a possible path: a way of living together that does not seek to neutralize differences, but to work with them over a long period of time in a shared space, where attachments are replayed through the seasons and different uses.

Dimension 1. An entangled web of interdependencies. Since the late 1960s, the Greater flamingo population has benefited from the availability of an artificial site known as the Fangassier islet for reproduction (Johnson and Cézilly, 2008). This was constructed within a salt pre-concentration basin located within an industrial salt marsh. Tens of thousands of birds return faithfully to this man-made landscape each year to set up their nesting colony. In return, their presence adds to the perceived interest of the landscape and symbolic significance of this vast territory, which is highly valued for tourism and rice farming. However, it should be noted that this interdependence has never really meant harmony. Tensions with rice farmers are common in spring, when the birds come to feed on the flooded, freshly sown rice fields (Tourenq et al., 2001). These tensions serve as a reminder that any de facto ecological solidarity involves friction (Mathevet, Bousquet, et al., 2018). What one considers cohabitation, the other often experiences as a real nuisance. In this context, the flamingo is not just a resident of the delta. In fact, through its choice of nesting and feeding grounds (lagoons, hunting marshes and rice fields), it influences water management practices and determines human access to certain areas. This situation renews the territorial approach to this vast wetland. The species does not remain confined to a reserve, but crosses into and is part of a socio-natural system—a hybrid space in which non-human life influences technical and political decisions.

Dimension 2. From conservation efforts to interspecies diplomacy. As we have already pointed out, this fragile pact has its origins in a founding act. This involved constructing an island to encourage the nesting of a species that was endangered in the western Mediterranean region at the time (Mathevet and Béchet, 2020). A rather diverse network of actors was behind this decision and the action that followed. These included Luc Hoffmann, a Swiss philanthropist, ornithologist and environmentalist who founded the Tour du Valat research center for the conservation of Mediterranean wetlands, and the industrial salt producer Salins du Midi. This original mobilization led to a novel approach at the time: viewing the flamingo not just as a beautiful bird to be observed or to enliven delta landscapes, but as a partner for the future. This approach has continued to this day, thanks to the collaboration of the Camargue Regional Nature Park and several NGOs. However, when 6500 hectares of salt marshes were

withdrawn from exploitation in 2007 and sold to the Conservatoire du Littoral (i.e. national coastal conservancy), a new form of responsibility emerged in the face of climate change. Rather than maintaining the former dike system that protected the abandoned salt pans from flooding by the sea, and given that no economic activity needs to be protected behind the sea-front dike anymore, the aim of managers, although constrained by costs and feasibility was to implement a nature-based solution and restore the salt marshes to their former state, while maintaining the presence of flamingos (ibid.). This new approach is based on a shared territorial ethic, blurring the boundary between gardened and preserved nature in favor of creating a collectively evolved environment with more room for uncertainty and free evolution.

Dimension 3. Coexistence under certain conditions. The Greater flamingo, as a symbolic species and conservation emblem, acts, makes choices, causes disturbances, and moves around. Its comings and goings between marshes, lagoons, and rice fields change the way the land is used. Its economic value to tourism, regional marketing and PGI agricultural products, such as rice, salt and wine, adds to its ecological and symbolic legitimacy. However, this recognition also necessitates governance in the form of banding young birds, tracking certain adults via telemetry, controlling predators, and supplying water to the breeding pond. The care taken of the flamingos involves almost constant technical monitoring. This form of biopolitics of cohabitation (Anderson, 2012) highlights the ambivalence of a relationship in which the animals exercise their freedom within a carefully considered management framework. Nevertheless, this relationship does not appear to be unilateral. Through their movements, flamingos force managers, rice farmers, and conservationists alike to constantly adjust their plans (Mathevet and Béchet, 2020). Its presence constrains and compels compromise. This dynamic coexistence is far from peaceful and invites us to rethink the frameworks of ecological governance as spaces for interspecies negotiation.

Dimension 4. Governing instability. The governance of the flamingo is based on a combination of specific actors, such as conservation NGOs, farmers, public institutions and researchers, as well as genuine multi-stakeholder cooperation. It also involves a varied portfolio of instruments, including contractual arrangements, territorial arbitration and scientific monitoring. However, this form of governance does not eliminate dissent or minimize significant agricultural damage in some years for a handful of rice farmers (Ernoul et al., 2014). Current tensions between the Conservatoire du littoral's project to restore the former salt marshes and the new director of the Salins Group's plans to industrialize or use the area again serve as a reminder that compromise is always vulnerable to erosion, whether coastal or not. The Greater flamingo acts as a territorial mediator, and its mere presence can crystallize divergent visions of the delta's future.

Although it can be presented as a model of coviability, the case of the flamingo must be viewed in light of the specific conditions that made it possible. It is a particularly charismatic species in a context of long-term institutional support that promotes a positive relationship between conservation and local development. However, these elements cannot simply be generalized; above all, they remind us that any successful coexistence is ultimately the product of a unique institutional arrangement, rather than the simple application of a coexistence model. Therefore, what matters here is not so much the success or absence of real conflict, but what it teaches us: cohabitation always involves negotiation. In this negotiation, flamingos are not passive beneficiaries, but demanding partners who impose their rhythm on human policies in the area.

4. Conclusion: towards a relational governance of living beings

The contemporary tensions surrounding wildlife cannot be understood through the lens of the opposition between conservation and exploitation, or nature and culture. Drawing on pragmatic sociology, political philosophy, conservation ecology, social geography and anthropology, this work invites us to reconsider traditional dualistic perspectives (Latour, 1993; Haraway, 2008). Rather than thinking of wildlife as a mere object of management, we must recognise it as a full-fledged actor in co-produced spaces (Doré, 2025). Rather than referring to moral injunctions or technical and administrative tools, the principles of ecological solidarity, reciprocity,

Table 3. Comparative summary of the three case studies

Case study/dimensions	Ecological interdependence	Ethical-political commitment	Relational dynamics	Governance and justice
Wolf	Partially acknowledged: ecological roles under-recognized	Ambivalent: formal protection with increasing control	Conflictual: low agency recognition, threat framing	Unequal: limited inclusion, sectoral dominance
Wild Boar	Functional but reductionist: positive roles ignored	Instrumental: alliance of users, ethics excluded	Asymmetrical: no reciprocity, treated as nuisance	Exclusive: governance limited to exploiter
Greater flamingo	Fully integrated: mutual dependency acknowledged	Proactive: long-term interspecies commitment	Symbiotic: mutual benefits, mitigated specific costs depending of the year, agency considered	Inclusive: multi-stakeholders but fragile

and justice are rooted in lived, localised relationships charged with emotions, conflicts, and situated knowledge, as we have seen. In our view, integrating all of these into an understanding of socio-ecological sustainability means not separating the measurable effects of policies from the quality of the relationships they enable or prevent, such as recognized attachments, acceptable coexistence and shared deliberations on what we want to preserve together (Despret, 2019; van Dooren et al., 2016). To this end, we have developed a comparative framework tested with three case studies—the wolf, the wild boar and the flamingo—which symbolize three contrasting forms of solidarity: conflictual, utilitarian and symbiotic. In all cases, it is not the species that dictates the management approach, but the territorial arrangement that enables or prevents a certain degree of interspecific recognition. While the wolf embodies legal and symbolic oppositions and the wild boar is a resource negotiated between humans, the flamingo modestly illustrates the connections of sensitive coexistence based on co-presence, mediation and cooperation (Table 3). These models are not fixed typologies; they are invitations to consider the governance of living beings in worlds characterized by tension. Co-viability cannot be decreed; it is developed over time through interactions. This process requires us to take the agency of non-humans seriously, to value the various forms of knowledge that constitute territories, and to reform institutions so that they can listen to the connections within them. In this sense, the Camargue offers a living laboratory. Through its hybrid institutions—regional nature parks, research centres and local associations—it demonstrates how independent science, operational translation and third-party mediation can be combined. However, it also reveals the persistent limitations of a governance model that is still too often technicized, where the plurality of life perspectives struggle to find their place. Embarking on such a path requires an active pluralization of knowledge and reform of decision-making processes, creating management committees where professional, resident and non-human voices can confront each other without negating each other's contributions. It also implies rethinking aid and support regimes, moving away from compensating for losses and towards recognizing positive contributions to living territories (Büscher and Fletcher, 2020; Schlosberg, 2007). Making public aid conditional on demonstrating active solidarity—particularly in the context of the EU Common Agricultural Policy—would shift the terms of the debate from protection to cooperation and from regulation to relationships. Ultimately, advocating for relational governance of living beings means refusing to reduce them to their functionality. It means recognising their agency, their right to space, and their role in creating habitable worlds.

References to "negotiation" with wildlife must acknowledge their profound asymmetry. Habitat destruction, overexploitation, and centuries of systemic depletion have created an immense ecological debt, making reciprocity less a matter of balanced exchange than of restorative justice. Solidarity thus entails recognizing these historical asymmetries and creating conditions for species to persist and flourish. The ethic of bio-proportionality (Mathews, 2016) provides a useful horizon, reminding us that reciprocity cannot be reduced to tolerable negotiation but must aim to restore ecological space and time for all beings. It means turning ecological solidarity into a shared habitability—a way of living together and collectively shaping shared landscapes.

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